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## Improved Safety Generator and Portable Engine.

Fig. 1 of the accompanying engravings represent the Wilcox portable steam engine and safety steam generator combined. The engine is placed horizontally on the side of the generator. The cylinder, bed piece, slides, and main bearing are cast in one piece, and therefore cannot get out of line by displacement or the working strain upon the parts, and are not subject to unequal contraction and expansion either by the heat of the boiler or of the cylinder; indeed, the generator is so constructed, as will be presently described, that there is little heat given off from the exterior. The cylinder has a cast-iron polished jacket, the crank is balanced, the material is excellent, and the workmanship—as was evident to all who examined the engine exhibited at the late Fair of the American Institute—of the very best description. The connection of the governor with the inlet pipe is direct, and the pipe itself as short as possible, and of ample diameter; thus the steam is never cramped and the quantity admitted to the cylinder is under perfect control. The pump and fly wheel are placed on the side opposite the cylinder, the shaft crossing the back end of the generator. On the front are seen the steam gage, water gage, damper handle, etc. The whole arrangement is neat, compact, and serviceable.

Fig. 1

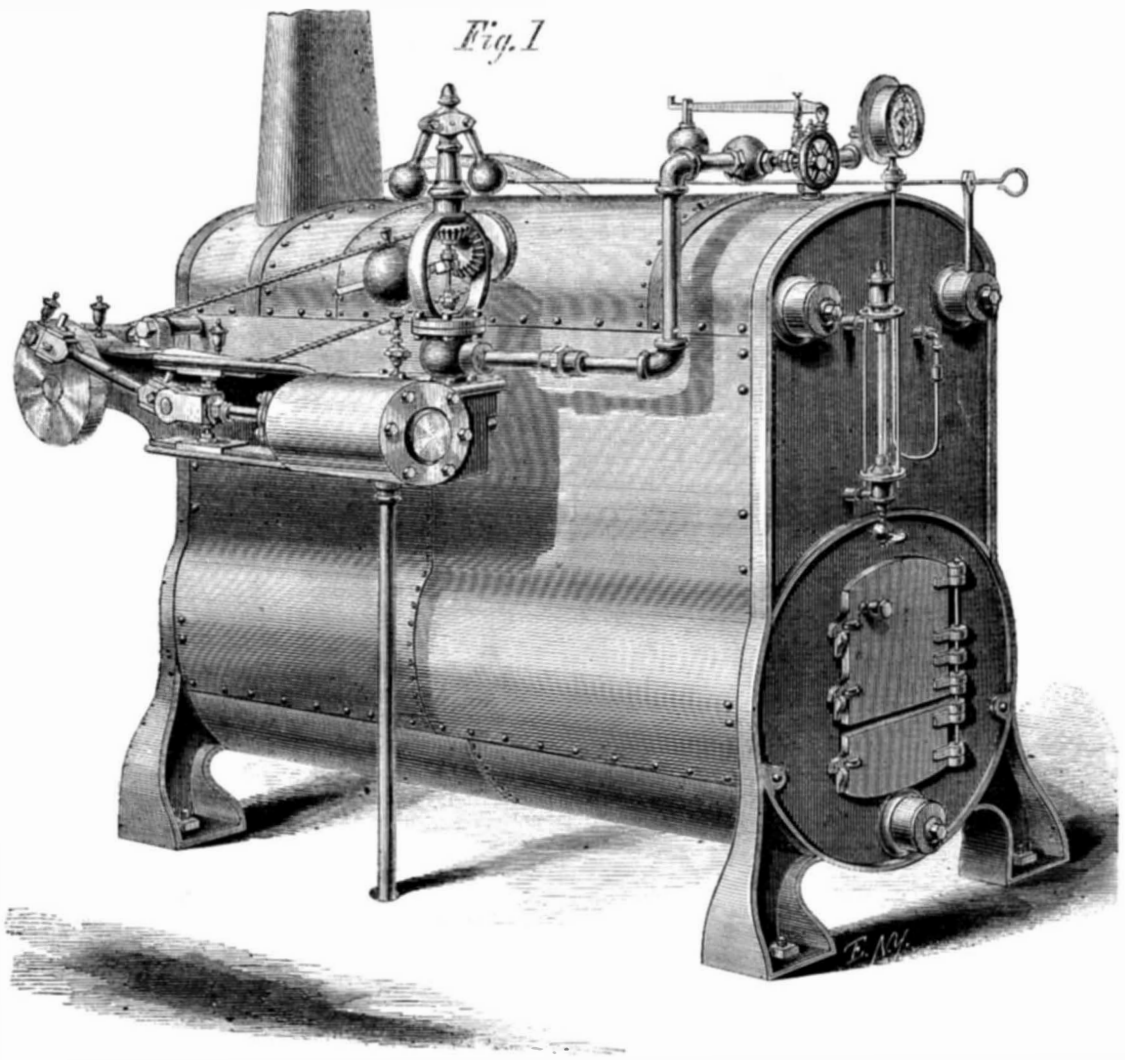
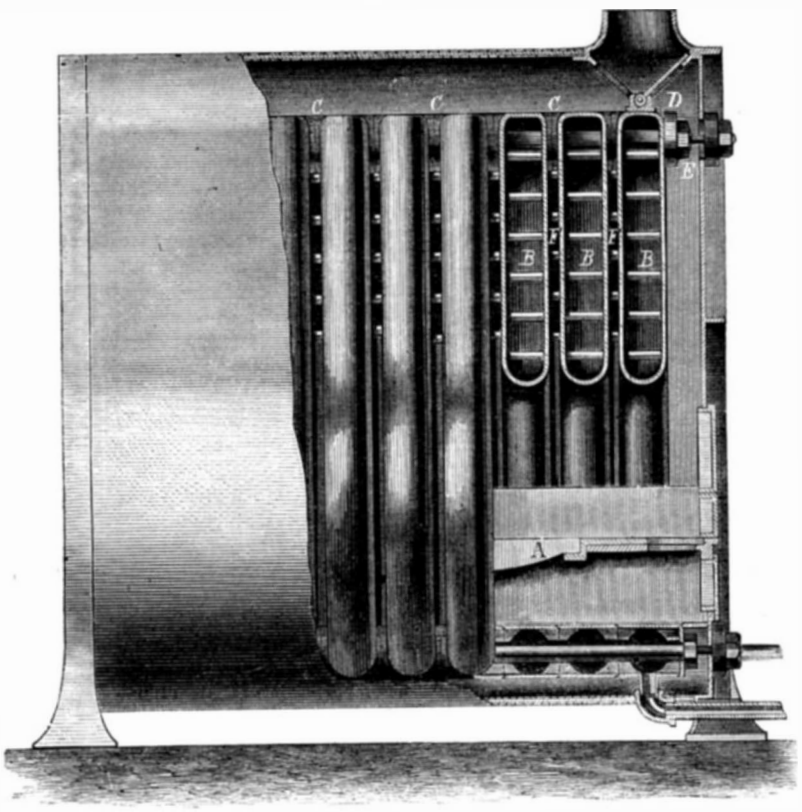


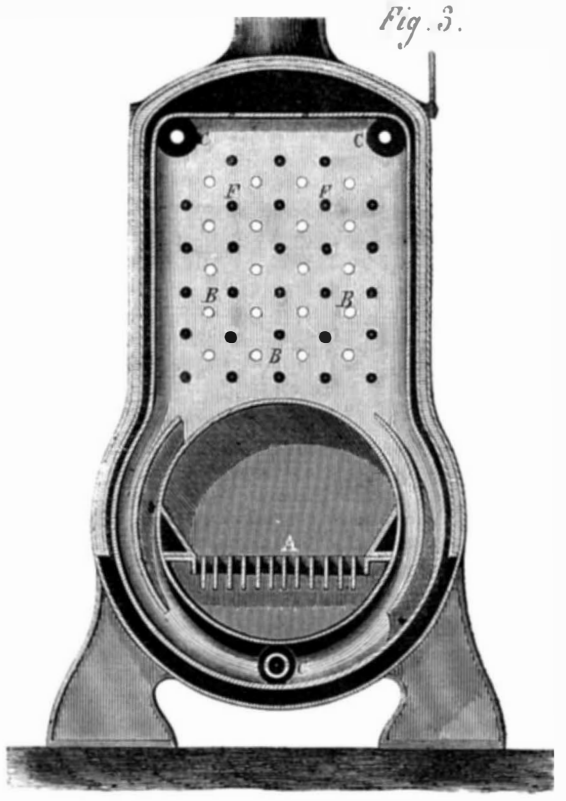
Fig. 2.




Figs. 2, 3, and 4 present different views of the generator, of which Fig. 1 is a perspective representation, which, however, is a small one, intended for a portable engine of from three to ten horse-power. Fig. 2 is a semi-sectional view of a portion of the generator. As will be seen, the generator is constructed in sections, one of them being shown very perfectly in Fig. 4. These sections are of cast iron, forming hollow chambers, which are fitted and bolted together to any required number. The lower portion is a ring which surrounds the grate, forming the furnace and ash pit, the grate being seen at A Figs. 2 and 3. The form of the fire box and ash pit is seen in the end section, Fig. 3. Tho upper portion of these sections is the steam chamber, or steam and water space. The flat sides of these chambers are stayed by numerous studs, cast in, which are represented at B, Fig, 2, and by the white circles in Fig. 3. There are three openings in each section surrounded by circular flanges, C, and by these openings each section communicates with those adjacent. These flanges are milled off to form the joints, each alternate one having a slight lip that fits in a corresponding recess in the next. The sections are then brought together and secured by means of a stout bolt passing through each of the apertures, C, upon which is placed a cap, D, and nut, E, Fig. 2. The sections are held by the milled flanges sufficiently far apart to allow the flame and gases to pass between their respective sides. The stays, B, are made with an excess of strength over the flat surfaces they support, so that when dangerous pressure occurs a small hole will be formed by the giving way of the metal between the stays before the stays themselves will part, and a disastrous explosion be thereby prevented.

There are curved partitions within the ring portion as shown in Fig. 4, for the purpose of aiding the circulation of the water. The column of water next the furnace is being constantly converted into mingled steam and water which being lighter than the solid columns of water on the opposite side of the partition, the difference in gravity induces rapid circulation, by which the steam is swept from the heating surface as fast as generated and fresh water is as constantly

Fig. 3.




brought in contact with the heated sides of the surface, the steam being carried to the chamber above, where it separates from the water and rises into the steam space, while the solid water returns to the other side of the partition, carrying with it the sediment, which settles in the quiet space below the grate, and may be blown out through a cock on the back end of the generator.

The same bolts that hold the sections together extend through the cast-iron ends and support the whole structure. The sides, top, and bottom of the generator—in fact the whole space between the cast-iron ends—is covered with a sheet-metal jacket made double and filled with plaster of Paris or some other non conductor, which prevents loss of heat by radiation.

Fig. 4.

Boilers constructed in sections have within a few years attained a great popularity, and this is not strange when it is considered that when the large mass of water and steam finds vent through the shell of a boiler, its sudden liberation spreads destruction around. If a hole of a few inches in area is made, the steam and water escape only gradually and without doing serious harm. It is impossible, probably, to prevent the giving out of boilers through carelessness or ignorance; the remedy appears to be to so construct the boiler that when any part fails, only a portion can give out at a time. This object may be attained by building the boiler in sections, so that if one fails the others are left intact and their contents liberated gradually by escaping through the small openings communicating with the ruptured section. The sections, however, of this generator are of such great strength that they can be burst only by the grossest stupidity. They

### THE WILCOX COMBINED STEAM GENERATOR AND ENGINE.

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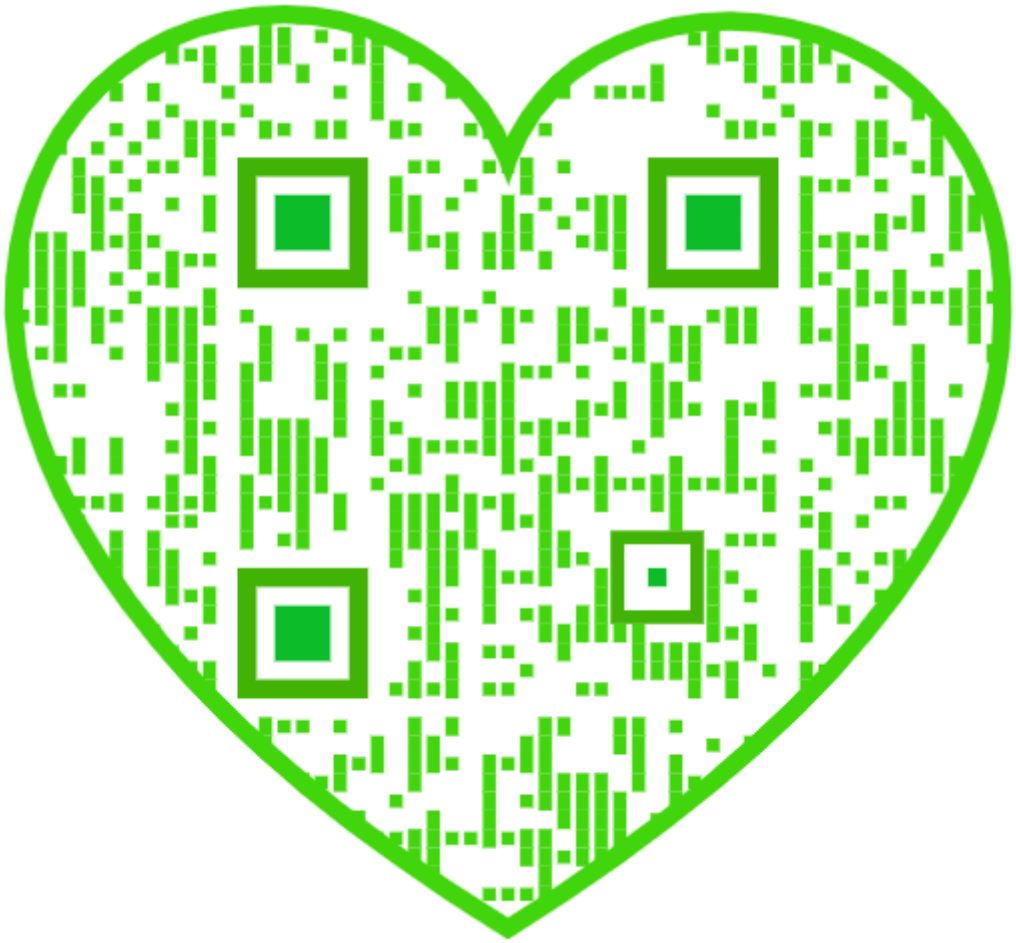

are tested to a pressure of from 400 to 500 pounds per square inch before being combined, even when the working pressure required is from 60 to 100 pounds only.

In small boilers there is not always sufficient steam and water capacity in proportion to the work demanded, and in case of a heavy load being thrown upon the engine or fresh fuel put upon the fire there will be fluctuations in the water level, the steam pressure inducing foaming and demanding constant care and the most skillful management.

This generator is so proportioned as to be free from the above objections, and is very economical in fuel and perfectly safe from danger of explosion. For further information apply to the Wilcox Caloric and Steam Engine Company, Providence, R. I.

## SURFACE CONDENSATION FOR MARINE ENGINES.---THE LOSS BY "BLOWING OFF."

The subject of the surface *vs.* the jet condenser is a constant theme with engineers, and although we do not by any means desire to pronounce against the employment of surface condensers in sea-going steamers, we think the economy attainable from their use is to a considerable extent overrated. In order to appreciate this, let us in the first place look at the possible theoretical gain attainable by the use of a surface condenser (irrespective of the cost of the apparatus and the expense of its maintenance), and then examine the drawbacks attending its employment.

The water of the ocean contains on an average $\frac{1}{32}$ part of its weight of salt, and it is a common practice with sea-going engineers to carry the water in the boilers at about double this degree of saltness, that is, containing $\frac{2}{32}$ parts of its weight of salt. It is clear that if the feed water enters the boiler at a degree of saturation represented by $\frac{1}{32}$ part of its weight of salt, and the water in the boiler contains $\frac{2}{32}$ parts, and it is desired to keep it at the latter degree of saltness, one part of the feed water must be blown off into the sea, and that an equal part will remain to be evaporated. Now, from the fact that in order that the water shall not exceed this degree of saltness ($\frac{2}{32}$), as much feed water must be blown off as is evaporated into steam, many think that this loss is very much greater than it really is. Suppose the sum of the latent and sensible heat in the steam to be 1,210°, that the feed water enters the boiler at 110°, and is blown off at 230° (the temperature of the water in the boiler), the following simple calculation will show the loss by "blowing off"; 1,210° total heat in the steam—120° the temperature of the feed water=1,090° heat required from the furnaces for the water that is to be evaporated. Now the temperature of the water blown off from the boiler is 120°, and this deducted from 230°, the temperature of the water in the boiler, gives 110°, the loss of heat by "blowing off." As one part, requiring 1,090° is evaporated, and one part requiring 110° is blown into the sea, the total heat utilized from the fuel is 1,090°+110°=1,200°; and of this 110° is wasted. Hence 110°×100÷1,200°=9.16, the per cent of loss by "blowing off" to maintain the saturation at $\frac{2}{32}$. This method of calculation is of course applicable to any degree of density of the salt water in the boiler; it is only necessary to allow for the ratio the portion of water blown off bears to the portion evaporated. Supposing, for instance, that the degree of saturation of the water in the boiler was $\frac{3}{32}$ (a saturation sometimes maintained), instead of $\frac{2}{32}$, the calculation of loss would be as follows, bearing in mind that in this case *two* parts of the water pumped into the boiler are converted into steam, while but *one* part is blown overboard. Therefore 1,090°×2=2,180°, is the heat required from the furnaces for water that is converted into steam; and hence, 110° (temperature of the one part blown off) ×100÷2,180=5.04 per cent, the loss by "blowing off" to maintain the saturation at $\frac{3}{32}$. And the same method of calculation may be used to ascertain the economy of using a heater to raise the temperature of the feed water, by passing it around or through a series of tubes, on the other side of which the hot water blown off from the boiler circulates, before being discharged into the sea. But it should be pointed out that it will not give a true result to calculate the loss by "blowing off," first with the heater and then without it, and then to call the difference between these two amounts the gain; for the reason that this method does not bring the important element of the heat imparted to that portion of the water which is converted into steam into the calculation, the saving is the difference between the heat required from the fuel to boil off that portion of the water which makes the steam. Thus, if without a heater 1,250° is required, and with a heater but 1,150°, the gain will be 1150°×100÷1,250=8 per cent.

It need scarcely be stated that the object of blowing off a portion of the water from boilers using sea water, is to prevent the deposit of salt and other substances, which form scale on the heating surfaces. If a portion of the water was not blown off, the boiler would speedily become choked with salt, and the heating surfaces incrusted with a thick layer of hard, non-conducting scale; because only pure water is evaporated, and the solid substances in it remain in the boiler. It will be readily perceived that if the water is carried at such a degree of saltness as to cause the surfaces, which conduct the heat of the furnaces to the water, to become incrusted with a non-conducting substance (such as scale is), that not only will the evaporative efficiency of the boiler become less and less, as the deposition of scale increases, but the incrustation may become of such a thickness, on certain parts, as to almost prevent the heat of the fires from being transmitted to the water; as a consequence of this condition, those portions which are exposed to the highest temperature from the furnaces—particularly the crown sheets—are liable to be made red hot, and to be bulged in and ruptured, allowing the scalding water and steam to escape over the fires. This being the case, if the engineer stints the quantity of water blown off, although at first he will be able to carry more steam and burn less coal, it will not be long before he will find that "she does not steam as well as she did," and the coal pile is being reduced more rapidly; hence it is far better to submit to the constant, but not increasing loss of a liberal "blowing off," than by stinting it to make a little more steam at first, in a short time to be followed by such a degree of incrustation as not only to far more than neutralize the economy attainable at the start, but also to incur a great amount of labor in picking off the hard scale, when the vessel arrives in port, as well as to shorten the life of the boilers by the overheating, and the incessant chipping of the scaling hammers.

With this state of affairs staring them in the face, it is not surprising that marine engineers have for a great many years given great attention to the method of condensation which, theoretically, returns pure fresh water to the boilers, and thus saves not only the loss of "blowing off," but also prevents the deposition of scale, and consequently keeps the heating surfaces in contact with the water in the highest state of efficiency. This apparatus, the Surface Condenser, is contemporaneous with the early history of steam navigation. Condensing the exhaust steam from the engine by bringing it in contact with metallic surfaces, the other side of which is maintained at a low temperature by contact with water, and then pumping the fresh water made by this condensation of the steam from the engine back again into the boiler, is a method so obvious that it is not surprising that our forefathers, engaged in steam navigation, made use of it; the more so as they were bothered with scale from the outset, much more, in fact, than we are, because their boilers were but poorly contrived to give the easy access necessary for the use of scaling tools.

But in the early history of surface condensation it was soon found out that the theoretical gain expected to attend its use was not attainable, either as regards stopping the waste of heat by blowing off, or wholly preventing the formation of scale on the heating surfaces.

It was soon established that if the surface condenser was practically perfect—that is, that there was no leakage between the salt and fresh water compartments, and salt water was pumped back into the boilers by the feed pump—that the boilers were speedily corroded or eaten away, and injured even more than by the effects of incrustation. Various hypotheses have been from time to time advanced in explanation of this phenomenon. Among others, that the corrosion was caused by galvanic action; the voltaic current, according to this theory, produced by the contact and circulation of the feed water about the brass of the condenser and the copper of the feed pipes. No sooner had this view of the case been generally talked about among engineers, than copper or brass feed pipes were suppressed, and cast iron substituted; besides, the tubes, and indeed every part of the condenser made of brass which came in contact with the feed water, were covered with tin. So if copper and brass had any thing to do with corrosion, it clearly would stop as soon as that cause was removed. But as far as our knowledge goes, and from conversation with many sea-going engineers of great experience, it does not seem that these changes have effected any good at all, except to save the expense of a little brass. The view, however, which seems to explain this corrosion more satisfactorily than any other is, that it is caused by a chemical action of the feed water on the clean surfaces of the boiler. And means to prevent corrosion founded on this explanation, appear to have been uniformly followed by very satisfactory results. It seems to be pretty conclusively established that if the surface condenser is tight, and the feed water boiled off, condensed, and pumped back again into the boiler for a considerable time, without being changed by blowing off or mixing it with sea water, that the feed water acquires an acid and corrosive property which attacks the seams, and also selects places in the middle of sheets to eat into, until the iron often looks as though it had had the small pox.

This corrosive property of the feed water, so it is stated, is acquired from the decomposition of the lubricants used in cylinders and steam chests, more particularly the tallow, doubtless increased from the sulphuric acid almost always used in its rectification. The means to prevent corrosion, if it is produced by this cause, at once suggest themselves; they are twofold; first, a thin layer of scale must be permitted to form on the interior surfaces of the boilers, and the water in them must be frequently changed, by blowing off and pumping salt water into them. The layer of scale of course prevents the water from coming in contact with the iron, and changing the water cleans it of the corrosive properties it may have acquired by continually passing through the engine. This method is now the usual practice with sea-going steamers fitted with surface condensers, and we believe the difficulties which not long since bid fair to put a damper on its use have been wholly removed. Again, the tallow and oil used in the cylinders is carried over into the condenser by the steam, and sometimes to such an extent as to choke the tubes, and frequently to form hard balls, or pellets, which collect in the condenser and sometimes interfere with the action of the valves of the air and feed pumps.

And this fact leads us to a consideration of the construction of surface condensers. The condensing surfaces almost always consist of a great number of small tubes, by some engineers made $\frac{5}{8}$ of an inch outside diameter, and seldom if ever over 1 inch; now the great end to be attained in the construction of this species of condenser, is to secure these tubes in the tube heads, so that the joints will be tight, and at the same time to allow the tubes to slip back and forth through the joint as their lengths are altered by the varying temperatures within the condenser; further, these joints must be made so that the tubes may be easily and quickly withdrawn, either to clean them from the impurities already alluded to carried over by the steam, or to replace a defective one. Simple as these conditions may appear at first sight, the fact that there is scarcely a point about the marine steam engine which has received so much attention from engineers as this one, and has been the subject of so many patents, shows that it has not by any means been an easy problem to solve. The expense of some of these plans is so great as to almost preclude their use in ships designed for commercial purposes. For instance, in the patent adopted by Mr. Isherwood for the navy, each joint is made in the thick brass tube heads as follows:—first, a hole, a loose fit for the tube, is bored through the head, then this hole is counterbored about half way through, thus forming part of a stuffing box; into this larger hole a rubber ring is inserted, surrounding the ends of the tubes, which projects a short distance beyond the head; a polished brass ferrule, or ring, is then inserted around the tube, and rests on the rubber ring, on which it is pressed by a composition follower, which is large enough to perform the same duty for a great number of tubes. This follower is bored similar to the tube head, that is, first with holes the size of of the tube, and then counterbored to suit the ferrule, which forms the gland of the stuffing box. As many of these condensers have six or seven thousand tubes, and thus require 12,000 or 14,000 such complicated joints as we have just described, the enormous expense of constructing such an apparatus will be easily perceived.

With this plan not only is it almost impossible to discover a leaky or defective tube, but after it is found out, a heavy follower, which makes the joint of several hundred tubes, has to be removed. Again, as this follower presses on the glands of so many stuffing boxes, it is quite impossible to put the exact pressure on each of these stuffing boxes which the packing in them requires to make a perfect joint; the consequence is that a considerable number of the tubes are either so tightly packed that they cannot contract or expand without bending, or they are so loosely packed that the joints leak from the salt to the fresh water side of the condenser.

For these and other reasons it is pretty certain that this surface condenser is not only the most expensive, but at the same time the most inefficient introduced, and yet hundreds of thousands of dollars have been wasted in their construction in the U. S. Navy during the last five or six years.

Now that we have directed attention to the worst closed surface condenser we know of, we will take great pleasure in pointing out the most efficient, and at the same time the most inexpensive one yet introduced. The tubes are the same as in the former one, but they are secured into the heads in a very different manner. The heads are of cast iron, and the holes for the tubes are bored of a uniform diameter straight through them, about twice the area of the tubes. In the annular space between the tubes and these holes, a soft pine cylinder (in length about twice the thickness of the tube head) is driven. This simple device forms a positively perfect joint, because not only is it tight, but it allows in the most complete way for contraction and expansion, and so easy is this joint made, that the tube of a surface condenser of large size can be removed and replaced in one day by the firemen and coal passers of a steamer. This condenser is an American invention, and so complete is it regarded that it has been adopted extensively by the most conservative marine engineers in Great Britain. It is well known as the Horatio Allen patent.

To retrace our steps a little, we will direct attention to the fact that in the first part of this article we pointed out the losses caused by "blowing off," to prevent the deposition of salt and scale; surface condensation is intended to prevent those losses. From our remarks on this point it seems pretty plain that the possible theoretical saving attainable by the use of this type of condenser, is not over 12 per cent at the outside; and when the fact is borne in mind that this theoretical saving cannot, for reasons already shown, be obtained in practice, it is obvious that the actual saving is considerably less than that which is theoretically calculated. Experience and observation sustain the conclusion that the saving in practice is not over 8 per cent., and when against this saving is placed the great excess in original cost of this condenser over the ordinary jet, and its greater complication, it must be admitted that the field for the surface condenser is much more limited than would appear at first sight.

From what has been stated, it is obvious that for ocean routes of moderate length, when the accounts are squared at the end of a year, no real economy will be found to have resulted from surface condensation. For instance, to employ it on a Long Island Sound route, although the steamers scarcely ever leave water as salt as the ocean, is, to say the least, very short-sighted and extravagant engineering.

## SOME USEFUL HINTS.

Doctor Hall in his most excellent monthly for December states his views and experience on many utilitarian subjects in his unique way which we transfer to these columns.

By the way, a new volume of the *Journal of Health* commences on the 1st of January and we would recommend it as a most useful and entertaining family magazine. Price $1.50 a year, published monthly. Address W. W. Hall, M. D. No. 2 West 43d street, New York.

Driving Nails.—Within a year we have seen it stated, as a new truth, that if a nail were wetted in the mouth and if, in addition, the narrow edge was placed with the grain of the wood, it would seldom split the board into which it was driven. We well remember to have seen our father do this as far back as in eighteen hundred and eighteen. But errors and truth are alike exhumed from the grave of the past in mechanics

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medicine and theology, and even in so-called "science" itself; the best remedy under the circumstances is for each man to be for himself "wary" of what is new, look into everything proposed with a patient, close and critical eye, and never give up old things too readily; for in very many cases, our fathers were wiser in their generations than we sometimes give them credit for.

ANIMAL GRAFTING.—Mr. Best, a French naturalist, cut off a rat's tail and joined it on to the freshly cut tail of another rat; the parts grew together and waggled like any other tail; in four months it was found that all the proper vessels, veins, arteries, and nerves were supplied. Dr. Allen, of Bond street, narrates that a tooth freshly drawn from a negro boy was inserted into the socket from which his mistress had a "snag" taken, and it grew firm and did her good service for many years. It was considered at that time, that as the boy belonged to the mistress, so did his tooth and that hence the exchange was no robbery.

But the tables, later on, were turned against the white man. The owner of a plantation had a faithful and most truthful old negro, to whom he committed the fattening of a turkey for a Christmas dinner; but on Christmas morning the turkey was no where to be found; some of the other "hands," on being questioned, gave the information, that the faithful old servant had killed the turkey the night before and made a good supper of it himself. The master was surprised and greatly grieved; and summoning the old man to his presence, he acknowledged that he had killed and eaten the turkey. But, said the master, don't you think it wrong to steal from me that way, making use of my property? Why no, massa, that's no stealing. I'm your property and the turkey is in me, and we bofe belong to you as before, only turkey has changed places, and instead of being in the coop, he is in a safer place, in my stomach, and we bofe are yours, turkey and negro too and you have as much as you had before, so I done no wrong." The logic puzzled the master, and he let Sambo off.

FLESH UNITING.—It is a common surgical operation to supply a new nose or ear or part of the face or lips from the arm, letting them grow together, then cut the arm loose, and manipulate the flesh into the proper shape.

An iron gate slammed to, while my neighbor's child was holding to the stationary upright; the mother saw it from her window, and running to her child she found the fleshy part of the end of the thumb cut off; with great presence of mind she pressed the severed pieces together: they united firmly. Our readers may make a practical use of these facts in many of the accidents of life; after all, these are the application of a principle of a common cut or gash, for if instantly the sides are pressed together and are kept together, the healing process goes on with great rapidity, leaving only a scar.

HAIR REMOVED.—Persons are sometimes annoyed by hairs growing in unsightly places, which may be removed. Thus, take sixty grains of quicklime, forty grains of yellow sulphate of arsenic and sixty grains of powdered starch, make it into a paste with water, apply it to the spot from which it is desired to remove the hair, and in a few minutes it is done.

[But Doctor what is the effect on the skin of the patient?]

FROSTY WEATHER.—Few have failed to observe what a vigor and elasticity are imparted to both mind and body by a frosty atmosphere, and what a loss of all these there is in a hot summer day; this is probably owing to the fact that at noon of any clear frosty day in winter, there is ten times as much elasticity in the air as there is at any noon of summer; hence to all invalids, the days most valuable for exercise are those of frosty weather, and those least beneficial are where it is warm or thundery; hence every hour of daylight spent in the open air in frosty weather in some kind of out-door activities is that much gain to the vitality of the system, imparting vigor to the mind, elasticity to the body, and elevation to the moral feelings and power of the man.

SEA SICKNESS is caused in great part by the confusing effect which the tossing on the water has upon the brain, and multitudes of ways have been pursued for avoiding or at least mitigating this annoyance. The best plan is to let it have its course and rid the system of that excess of bile which is almost always present in this over-eating age; the general health rarely fails to be greatly improved by it, although in very rare cases, perhaps not over one in a million, dies under the effects of the long continued and exhausting retching. If a person will lie down with the eyes closed, and not allow the head for an instant to be raised from the pillow there is an almost entire exemption from nausea and other discomforts, but the result of this course is that it will be necessary to keep a-bed during the entire voyage; the effort should be to shorten the sickness and get rid of it as soon as possible, and this is best done by not lying down at all, but resolutely keeping on the feet on deck, in the open air, if the weather permits, that is, if it is not raining; this requires moral courage and some considerable force of will and character, but it seldom fails to abridge the period of sea-sickness, sometimes to confine it to a few hours duration and then the remainder of the voyage can be enjoyed as it ought to be.

The tendency to nausea on ship-board is abated somewhat by any stimulus which acts decidedly on the nervous system, such as chloroform, brandy, opiates, etc. Irritants, such as the strongest spices, abate nausea; so will great mental emotion, in short, any thing which draws off the attention of the mind. No person can get sea-sick if the ship is on fire, nor will a person who is drunk. A brisk purgative is good just before going on board or a dose of medicine taken the night before. Still the wisest, most healthful and most expeditious method of meeting sea-sickness is to avoid all preventives, all medicines, and manfully determine to keep upon your feet and let it do its worst.

In this connection space may be given to sea voyages, and the best means of enjoying them; and first of all have a plenty of woolen clothing and wear it even in midsummer except during the middle of still days; but every day, and all day a good flannel shirt should be worn next the skin even in the tropics, to counteract the baleful effect of damps, fogs, and changes of temperature. The British government compels its sailors to wear woolen flannel shirts all the year round in all latitudes as a result of its observed necessity in keeping off disabling diseases.

PROTECTING THE FEET from the dampness of the decks is an indispensable item of health and comfort on ship-board as the boards are seldom dry for two hours at a time in any voyage. Thick soled shoes and woolen hose should be worn at all times while at sea. Much has been said and written in praise of the pure air of the sea, but as a matter of fact very little of it is obtained by passengers as a general rule, because a bilgy odor pervades the cleanest ship's cabin, and when it is taken into account that in these cabins passengers confine themselves from sundown to a late breakfast next day, and that soon after breakfast the decks, having been washed, are still wet, making it near noon before it is safe for ladies, with their thin shoes, to promenade; it is evident that a very few hours of the most pleasant days are devoted to the breathing of the pure salt sea air, and when it is remembered too, how few days at sea have an entire exemption from rain and raw winds, it is evident the much lauded good effects of sea voyages, especially to invalids, is more a myth than a reality. The truth is, to obtain the very highest healthful advantages of pure air, nothing approaches moderate, leisure working in the garden or the orchard.

## Correspondence.

*The Editors are not responsible for the opinions expressed by their correspondents.*

### Experiments with Boiler Foam Pipes.

MESSRS. EDITORS:—On page 324, No. 21, current volume SCIENTIFIC AMERICAN, I noticed an article entitled "The Effect of Variable Calibers in Foam Pipes." I have seen and used on several occasions the "foam pipe" there spoken of, but in two only did I notice the curious fact that your correspondent speaks of, and in both cases they were attached to tubular boilers which were used to supply steam to stationary engines. In one case I experimented pretty thoroughly and attached a glass gage to the foam pipe as well as to the boiler. The pipe was three-quarter-inch, and was screwed or tapped into the top of the boiler and led from the steam space above to the water space below, near the bottom of the boiler, and was between four and five feet long and was tapped into the bottom the same as at the top, so the difference in diameter could have been but little, if any.

When getting up steam the water always stood highest in the boiler which I attributed to the increased bulk of the water by heat, while that in the pipe was yet cold and weighed more than that in the boiler, bulk for bulk. But when I opened a cock at the bottom of the pipe and let out the cold water while the hot filled up the pipe again, it would rise to the same level as that in the boiler; the difference was not great, still I think it acts on the same principle when the steam is up and forty or fifty pounds pressure on, for with that pressure and with but little fire on and no steam passing from the boiler, the water would be the same in both gages, but when I started the engine and before the work was put on the water in the foam pipe would settle but little and as soon as the load was put on the engine, it would settle still more.

I discovered also that when the fire was out (providing, however, that it had not been out too long), and fifty or sixty pounds of steam on, and I raised the safety valve so as to let the steam escape freely, the water would settle as before, or if the steam was low and I increased the fire, and there being a heavy load on the engine at the same time, the same effect as before, only the depression of the water was more marked.

From this it will be seen that the water rose or lowered in the pipe just according to the amount of heat and quantity of steam used. I judged from this that while the water was in a state of ebullition and full of minute globules of steam passing upward to the surface, which would increase its bulk, (while it is obvious that the water in the pipe is perfectly quiet,) it could not receive heat enough from those two three-quarter-inch holes to cause it to boil, although at the same time it might be nearly as hot as that in the boiler.

The cause of its settling when the safety valve was raised (the fire having been put out previously), I attributed to the decreasing pressure causing the water to boil, on the same principle that hot and nearly boiling water placed under the receiver of an air pump will boil. My theory may be wrong, but I shall feel justified in holding to it till I hear a more plausible one. D. A. MADDOCK.

Lenoxville, C. E.

### Relative Size of Pump Barrels and Tubes.

MESSRS. EDITORS.—J. P. B., on page 359 current volume of the "SCIENTIFIC" notes difficulty in raising water 25 feet through 56 feet of pipe, with a pump of 2½ inch barrel. I think that a smaller sized pump barrel should be used, also that the draft pipe should be large. In a similar case I found that a large pump, though it would raise the water, worked so hard that its use was impracticable, while a much smaller one works easily and delivers the water freely. Scientifically, the reasons for such a result may be seen as follows:—

1st, The pressure upon piston valves of different sizes in sustaining water at the same hight is in proportion to their areas.

2d, The pressure upon the same valve at different hights is in proportion to the hights.

3d, The pressure on valves generally must be in proportion to the products of their areas into the hights at which the water is sustained or raised. With a given power at the pump handle, therefore, it is plain that as the hight of the water increases, the area of the valve (or cross section of the pump barrel) must decrease.

Again, the smaller the tube through which it is drawn the greater the amount of the friction of the water against its sides in delivering the same quantity of water; and the larger the pump the greater the quantity of water required in the same time, which would also increase the friction, consequently by increasing the size of the pump and diminishing the size of the tube, a limit would always be found beyond which, because of friction alone, the water would refuse to obey the action of the pump.

In conclusion it may be remarked that inasmuch as the increased size of the draft tube will not in the least effect the amount of pressure on the piston at vent, it will in all cases be found advantageous to the easy and free delivery of the water to use large tubes rather than small ones, especially where they must be of great length. M. N. HORTON.

Oneida, N. Y.

### Electricity.

MESSRS. EDITORS:—Electricity is defined to be the name given to an imponderable agent which pervades the material world, and which is visible only in its effects. It is exceedingly elastic, susceptible of high degrees of intensity, with a tendency to equilibrium unlike that of any other known agent. Whether it resides only on the surface, or penetrates into the interior of a conducting body, appears to be a matter of dispute among electricians, at least in regard to dynamical electricity, though it is difficult to imagine why there should be any difference in this respect between the statical and dynamical. If electricity be material, it must possess gravity, and attract and be attracted as other bodies. All bodies would be surrounded by an atmosphere of electricity, each in proportion to its mass, or what would be the same in effect, the the electricity (from its exceedingly elastic nature penetrating all space) would be more or less dense in proximity to other attracting bodies. If the mass of a given body should be by any cause reduced, it is evident that there would be a corresponding want of capacity to attract or retain electricity, and the equilibrium would be restored by the excess passing to some other body. A current would be formed by reducing the mass of friction (as in the electrical machine), or by oxidation (as in the galvanic battery), in consequence of one body attracting electricity from another constantly diminishing body. The attraction of gravitation would seem to be the immediate, and the reduction of the mass of a body, the primary cause of a current of electricity. A telegraph wire having its own atmosphere of electricity, a wave communicated to one end would be propagated through its entire length. In an electro-magnet the atmosphere of electricity being put in motion by the current of the surrounding coil, would form an electric screw, which at one end (pole) would screw into and attract, and at the other end (pole) would unscrew and repel the electric nut of another magnet. Having been engaged for some years in perfecting a machine for developing the motive power of electro-magnetism, these hints are offered more for the purpose of obtaining information than of imparting it. FRANKLIN.

Cairo, W. Va.

### Some Questions on the Day Line Matter.

MESSRS. EDITORS:—Please give the following questions a place in your paper for the consideration of its readers:

Suppose a man start from New York on Monday noon, go west, keeping pace with the sun, in his journey around the globe, where would he pass from Monday to Tuesday?

When it is Monday noon at New York it is 48 minutes past midnight at Pekin, in China; is it Monday or Tuesday at Pekin when it is Monday noon at New York?

When it is Monday noon at New York, how far is it Monday east and west from New York on the globe?

Is there a certain point of time in the revolution of the globe when it is Monday, for example, on the entire globe and twelve hours from that time, Monday on one half and Tuesday on the other?

Is there a certain point on the globe where the days of the week begin and end; if so, where is it, and what cause has fixed that point?

These are no visionary questions, and can be readily and definitely answered. LYMAN THAYER.

Burlington, Vt.

### Musical Vibrations.

MESSRS. EDITORS:—The above subject being before the readers of the SCIENTIFIC AMERICAN from an article in a late number, I would inquire if the squeaking and chattering of lathe tools has been observed as a method of indicating the frequency of the vibrations. The tone being observed and the velocity of the moving surface known the chatters on a given space may be counted with apparently a correct result. A side tool with large work, not too firm, affords eligible conditions for the experiment. H. W. C.

Newark, N. J.

The Paris Exposition gives 16,000 medals. As each will bear the name of the recipient, they will not all be ready before next March.

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### Improvement in Hoops for Children.

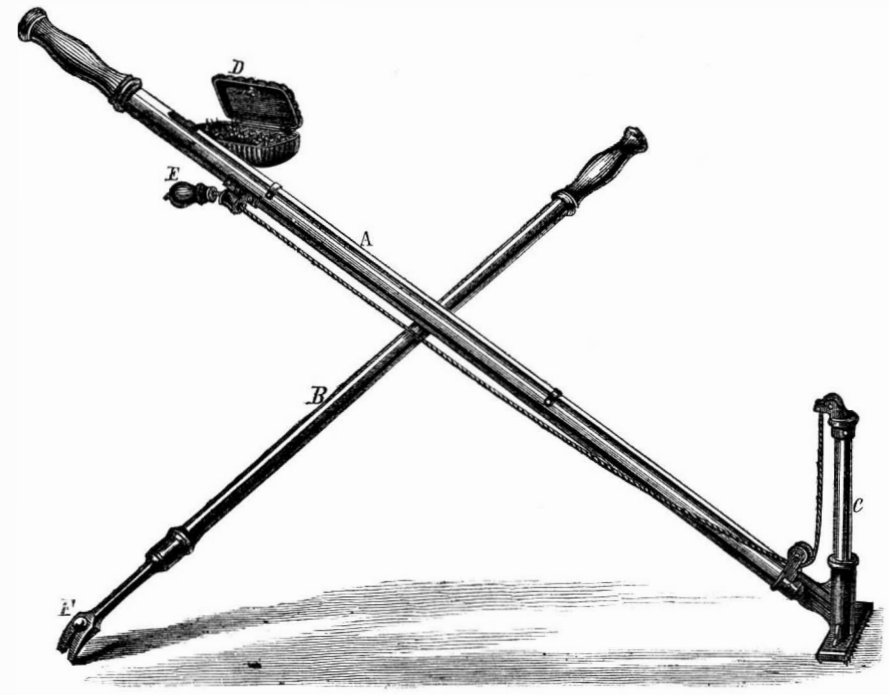
The engraving represents a hoop with its handle, the design and operation of which is perfectly clear without a detailed description. Attached to the hoop is a split or slotted handle having four rollers bearing alternately on the inside and outside of the hoop and allowing it to turn with the greatest ease. The young operator grasps the handle, inclines forward, and and starts on the run, when the hoop obeys the impulse and the flag streams out inviting him to follow. As the hoop cannot escape the direction in which it is guided, the child is not compelled to retrieve his toy from the mud of the streets nor risk his safety by getting in the way of passing carriages. This device makes hoop rolling practicable for very young children who have not acquired sufficient skill to govern the course of a hoop by the ordinary stick.

It was patented July 16, 1867, by James Faye, who may be addressed for rights or further particulars at No. 476 Pennsylvania Ave., Washington, D. C.

FAYE'S PILOT HOOP.

### Device for Stretching and Laying Carpets and Drawing Tacks.

One of the most unwelcome and tiresome jobs of house-cleaning and household removal is the annoyance of taking up and putting down carpets. There are aching backs, sore knees, and pounded fingers, to be expected as inevitable. These are wholly avoided by the carpet stretcher and tack driver shown at A, in the illustration. This tack driver and stretcher consists of a wooden handle of convenient length for stretching a carpet without compelling a stooping position for the operator, while at the same time allowing the weight of the body to act at the greatest possible advantage. At the bottom of the foot of the upright, C, and placed at the proper angle, is the stretcher, so constructed with two rows of serrated teeth that the hold taken upon the edge of a carpet is such that no damage can happen to either the most expensive or the thinnest carpet, as frequently happens by the usual stretchers, while the carpet is stretched stronger and more evenly with a much less expenditure of strength than by any other method.




BROWN'S COMBINED CARPET STRETCHER AND TACK DRIVER.

Recessed on the upper side of the handle is a small brass tube, which leads into the base of the upright, C. Into the upper and open end of this tube, near the tack box, the tacks are fed one by one, either leathered or of the ordinary style, and of any size, as fast as wanted, which instantly descend by their own gravity under a hammer inclosed in C, which is raised by the cord and handle, E, against the tension of a strong spiral spring, which upon releasing the cord, is thrown with great force upon the head of the tack, driving it, at one blow, home. When the tack first falls into the base of the upright, C, the point drops into an inverted hollow cone, having a small aperture at the apex, and split longitudinally into three equal parts, held together by a simple rubber spring. While the point and body of the tack drop through the opening, the tack is prevented by the head from passing through until the blow of the hammer overcomes the slight tension of the rubber spring, and at the same time instantly drives the tack into the carpet. Having ourself tested this useful implement in putting down two carpets, we have not known it to fail in a single instance of driving the tack entirely home.

It is evident, at a glance ,when working upon a new or too small a carpet, where it has heretofore taken two persons—one to stretch while another drives the tacks—that this saves the labor of one person entirely ; while the tack can be driven nearer the base or mop boards than by any other method.

Since the teeth of the stretcher do not project through more than one thickness of a carpet, the facility with which a carpet can be doubled under (or what amounts to the same thing, over) as it is laid, is not one of its least advantages.

The adaptability of this labor-saving implement for driving tacks in the most inconvenient nooks or corners can be readily appreciated by our American wives and housekeepers, as calculated to lighten their cares and labors. The tack box, D, is adjustable at any angle, to provide against spilling the tacks while moving the instrument. The tack drawer shown at B, represents a long-handled and peculiar claw, which, by reason of its length and projection, F, which acts as a fulcrum, extracts tacks as quickly and easily as the driver puts them in, without stooping or exertion.

These devices attracted great attention at the American Institute Fair, held in this city last September and October, and received there the highest premium.

They are patented in this country under two patents granted Wm. Brown, of Springfield, Mass., dated Feb. 5, and July 30, 1867 ; and are also patented in Great Britain, France, etc. Wm. M. Evans & Co., 55 Beekman street, are sole manufacturers for the United States and Canadas. G. E. Harding, General Agent for New York city and New England States. 726 Broadway, New York. By reference to the advertising columns it will be seen that agents are desired immediately for its sale.

### Modified Collodio-Chloride Process.

It is often a matter of considerable value in photography to take up an old process, or an old idea, and view it in the light which the experience of years is capable of shedding around it. Much good might result to photography if all working at the art would occasionally look back on the days gone by, and seek out the good and useful of the past for the purpose of molding it to the requirements of the present or the prospects of the future. An old idea revived, but clad in a new dress, now and then makes its appearance, often at an opportune moment. This remark is specially illustrated by some photographs lying beside us as we write, and which, for delicacy and beauty, could scarcely be surpassed. The mode in which these were produced we shall now briefly describe :

A good sample of collodion is obtained—one which will yield a rather tough but not too contractile film answers better than any other—and to the sample a soluble chloride, such as chloride of calcium, is added in the proportion of four grains or five to each ounce. Of course the salt should not be added directly to the collodion, but a solution made as follows :—Chloride of calcium, 16 grains ; alcohol, 1 ounce. Two fluid drachms of this solution are added to six drachms of the collodion, and the proper strength thus ensured.

A thin specimen of enameled paper is now selected and coated with the collodion, just as an ordinary plate is covered with the film. The paper now resembles ordinary albumenized paper, and is submitted to similar treatment in the successive steps of the process. It is floated on the ordinary nitrate of silver solution, and, when dry, exposed under a negative. The printing is quickly effected, and on removal from the frame, the proof is washed in water and toned. In the case of the prints before us the ordinary alkaline gold toning bath was used with excellent effect. The fixation and washing are conducted in the usual way.

The process is very simple and useful for many subjects requiring the rendering of the most minute detail, as the *cartes* before us will bear close examination with a powerful magnifier, and when thus scrutinized, not only bear ample testimony to the capabilities of the process, but also to the quality of the negatives from which the proofs were obtained. There is another element of some importance in these prints, which is not to be neglected, now that we have had such good reason to discuss the probabilities of the permanence or otherwise of our prints. We refer to the fact that as the increased delicacy in the rendering of detail is ensured by keeping the sensitive material on the surface of the paper, so is the integrity of the particles of metal constituting the finished print ensured by their envelopment in so indifferent a body as collodion is generally believed to be.—*British Journal of Photography.*

### A Good Old English Patent.

*Specification of the Patent granted to Henry William Vander Kleft, of No. 253 High Holborn, in the County of Middlesex, Gentleman ; for a method of constructing a Walking Staff, to contain a Pistol, Powder, Ball, and Screw Telescope, Pen, Ink, Paper, Pencil, Knife, and Drawing Utensils. Dated August* 17, 1813.

To all to whom these presents shall come, etc, Now know ye, that in compliance with the said proviso, I, the said Henry William Vander Kleft do hereby declare that the nature of my said invention, and the manner in which the same is to be performed, is described and ascertained in the following explanation thereof ; that is to say : The staff is about the usual length of a common walking cane, and is made of brass, and may be covered or veneered with prepared whalebone, leather, or any other substance, and the shape is round and rather conical, tapering from the head to the point. It is divided into nine parts, principally tubes (exclusive of the cap or head, and the top or lid of the inkstand), which are all screwed together, except that part containing the pistol, which is fastened by means of two spring catches fixed opposite each other. The first or uppermost part or division is an inkstand, with a metal lid screwed thereon, and a small hole in the center of such lid for a pen to pass through, and a metal knob or button to screw into the hole as a stopper, when the stand is not in use. The cap or head of the staff screws on the inkstand, and may be made of silver or any other metal. The second part serves for the handle of the pistol (which is made of iron), and fixed in the lower end thereof, the barrel being about five inches in length, and about half an inch in diameter ; the trigger shuts in underneath the barrel, and is projected by the act of cocking the pistol ; and the pistol is kept at half-cock, as well as the pan fastened down, when not in use, by a small bolt, affixed to the upper side of the barrel, the removal of which disengages the pan, enables the pistol to be brought to the full cock and discharged. In the upper end of the second part is placed a piece of wood, with three small holes, to receive a penknife, pen, and blacklead pencil, and the wood is covered with a brass or silver plate, with correspondent holes ; the distance of the plate from the opening is about an inch ; and on each side of the second part, near the middle, is fixed two small silver loops, through which pass a leather strap and tassel, to put round the wrist of the person carrying the staff. The third part is a hollow tube or case, for the reception of the pistol, with a narrower circular space at the bottom, to fit the muzzle, and keep it steady in the case ; and immediately underneath which space is a distended worm spring made of steel, with a small circular brass plate, upon which the muzzle of the pistol rests or presses ; the use of which spring is to throw off the pistol case and the lower part of the staff from the pistol immediately on pressing the spring catches. The fourth part is about eight inches in length, and forms a telescope, with two or more brass sliding tubes. The fifth part of the staff is a hollow tube, or case, for carrying writing or drawing paper in. The sixth part is a hollow tube or case, for carrying a piece of India ink, and several hair pencils. The seventh part contains a turnscrew, for taking off the fore part of the pistol barrel when it is to be loaded or cleaned. The eighth part is a small case for containing gunpowder. And the ninth part is a case containing the pistol balls. The eighth and ninth parts are made of brass, and form together the ferrule of the staff.

### To Preserve the Health of Gold Fish.

The following rules for keeping gold fish in a healthy condition have been furnished by a correspondent :

"For each quart of water only one fish, as gold fish cannot thrive if crowded. Do not change the source of water whether from well or hydrant. In summer renew it daily ; in winter only every second or third day.

"Shallow glass dishes should not be used. They should be deep and kept in the shade, strong light and a heated room being detrimental to the fish. The bottom of the globe should be covered with smooth gravel to absorb the excrements and keep the water clean.

In changing the water for cleaning the globe you should take the fish out with a fine net, but never with the hand. Do not feed them with bread or cake or any food containing tannin ; but give them wafers, ant eggs, flies, yolk of eggs, water cress, etc., but only once in three or four days and then sparingly.

"In the months of November, December, January, and February the fish should not be fed at all, as this is their hybernating season and food in this season is unnatural. In March, April and May they should be fed scantily.

"If these rules are followed the aquarian ornaments of your homes will live and thrive for many years."

The amount thus far subscribed for the Governor Andrew Family Fund, in Massachusetts, is eighty thousand dollars

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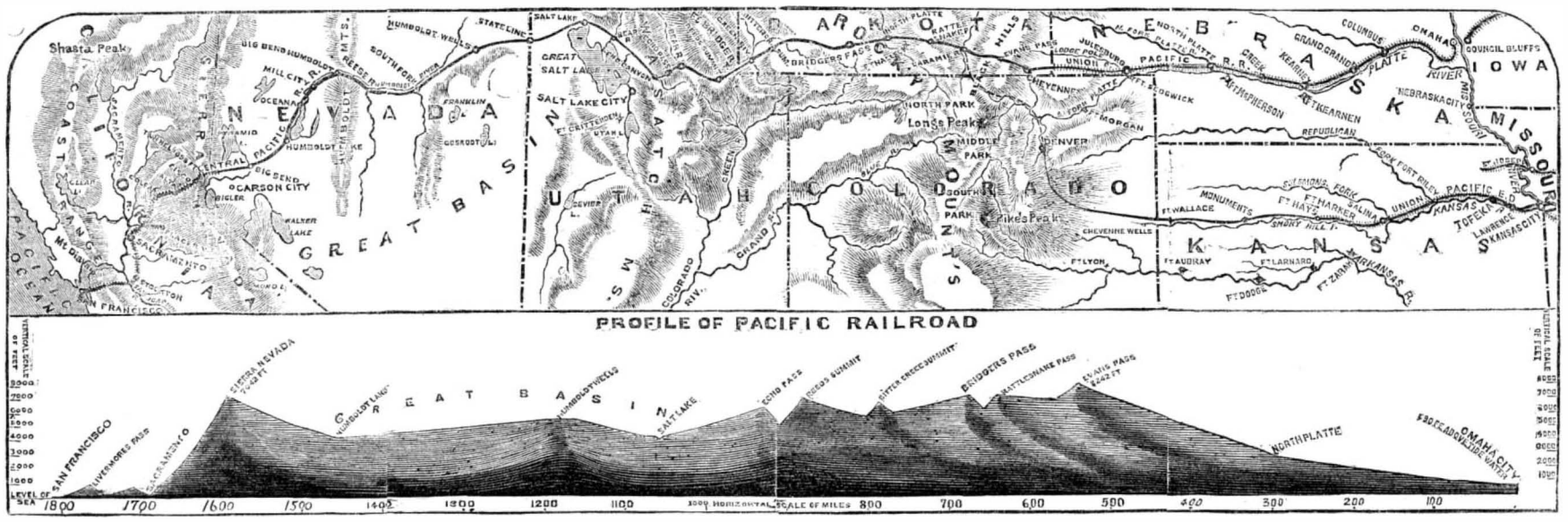
### The Great Trans-Continental Railway Line.

We have published several articles describing the object and mode of construction of the great railway line from Omaha, Nebraska, on the Miscouri River, to Sacramento, California. The line has, however, been generally mentioned under the title of what may be considered its eastern division, the Union Pacific Railroad, while in fact there are two companies, the one at the western end being known as the Union Pacific; and this company is building the road from Sacramento east to Salt Lake.

By the map which accompanies this article, it will be seen that this company has completed over 160 miles of the road, having reached the summit of the Sierra Nevada. The serrated lines show the roads as built, and the smooth lines the route and length of the unfinished portion; except that the former do not extend quite far enough to show the amount




**THE CONTINENTAL RAILROAD—MAP AND PROFILE MAP OF THE LINE FROM OMAHA TO SAN FRANCISCO.**

completed at the time of publication of this issue of the SCIENTIFIC AMERICAN. The Union Pacific Road is expected to be completed to Evans Pass, a distance of 555 miles from Omaha, by January 1st, 1867.

This point is the highest elevation on the route, as may be seen by the profile of the road.

The preliminary organization of the Union Pacific Railroad Company was made in October, 1863. The first contract for construction was made in August, 1864; but various conflicting interests, connected with the location of the line, delayed its progress, and the first forty miles were not laid until January, 1866. At that time all obstacles were removed, and the road has been built more rapidly than any other similar work in the world. There were 305 miles completed on the 1st of January, 1867, and contracts have been made for rock cuttings, to be done during the winter. The work on the California end of the route is being pushed forward with great energy toward the east, and it is expected that the whole grand line to the Pacific will be open for business in 1870. The present outfit of the company comprises ample depots, stations, car and repair shops, and all the equipments of a first-class road. It has now in use fifty-three locomotives, twenty passenger and mail cars, and seven hundred and ninety-three freight cars. The financial condition of the company is fully exhibited in an advertisement in another column.

### EDITORIAL CORRESPONDENCE.

*From Paris to Madrid—The Character of the Country—Bordeaux and its Wine—Pau and its Climate—The Spanish People—Agriculture, Manners, Customs, Towns, and Cities—A Spanish Railway.*

MADRID, November 18, 1867.

The troubles in Italy have turned the tide of continental travel toward Spain, and although this old dominion is familiar to most American readers by the writings of Prescott, Irving, and Ticknor, yet few comparatively of our countrymen ever visit it. A railway is now complete from Paris to Madrid, and thence to Cadiz, at the utmost southern verge of the Peninsula, with connecting links to Barcelona, Alcante, Carthagena, and Malaga, on the Mediterranean, to Lisbon, in Portugal, and to Bilboa, Santander, and St. Sebastian, on the north. The express train runs from Paris to Madrid in forty hours, but those who wish to perform the journey in an easy and comfortable manner will not omit to stop for a short time at the interesting old city of Tours, and thence on to Poitiers—both of which are filled with thrilling incidents connected with the life and times of Louis XI., Catharine de Medicis, and other great characters who have so swayed for good and evil the history and destiny of France.

A day spent in Bordeaux will well repay the time. It is a large thriving city, and stands literally above vast catacombs of wine and brandy barrels Its noble river, the Garonne, throngs with vessels from all parts of the commercial world, and is spanned by a massive stone bridge of 1,596 feet in length, supported upon heavy piers, the finest structure of the kind in France; the quay extends along the banks of the river for a distance of three miles, and presents a busy scene of rumbling wine carts, and a strange mixture of peoples and tongues. We visited the wine cellars of one of the largest firms in the trade, and were conducted through cellars and passages lined with hogsheads and stacks of bottles filled with the choicest vintages of the country. We noticed tier upon tier of bottles covered by the accumulated mold of a quarter of a century, quietly reposing in iron frames or stone vaults, increasing every day in value, and destined some time to tickle the palate of the epicure. Here is also to be seen a fine fragment of an old Roman amphitheater, built in the days of the Emperor Gallienus, and capable of holding 15,000 people. Its solid walls and massive arches attest the substantial character of Roman architecture, and seem likely to stand, while more modern structures crumble and fall to dust.

For a distance of sixty miles beyond Bordeaux the railway passes over a wide desolate plain of shifting sands, whose soil, cold, wet, and barren, barely supports a thick growth of briary shrubs, and some dwarf pitch pines, which supply the government with resin and turpentine. Upon the open treeless portion of these plains sheep are pastured to a considerable extent, tended by shepherds who walk upon stilts, and from this perched-up position they can overlook their flocks, and prevent them from straying.

In appearance, one of these peasant shepherds resembles a tall man upon two wooden legs; and so expert are they, that by the aid of a long pole, they can clear the country with the rapidity of a horse at full trot. They suffer great privations, and are short-lived; but they are Frenchmen, and prefer this nomadic life rather than emigrate to a land of plenty. Statistics show that in 1864 less than two thousand Frenchmen permanently emigrated from their much-beloved country.

From the old town of Dax—so famous for its dry bracing air—a branch road runs to Pau. The country all along this route is very beautiful and generally fertile. A most charming feature of the landscape is the well-fenced farms with noble farmhouses and outbuildings located thereon, the same as in our own country. It was pleasant also to see roses blooming in the gardens, and the farmers with their carefully blanketed oxen engaged in plowing, sowing, and other agricultural labors. I enquired the reason why working cattle when at work were kept covered with blankets, but no good reason could be assigned beyond the fact that the custom was immemorial—descending from father to son. As in other European countries the yoke is fastened to the heads of the oxen by means of straps wound around the horns, which seems to me a system of cruel torture, but it is old, and as custom among farmers in Europe appears to be arbitrary t would be useless to reason with them that the yoke upon the shoulders is far better than the one which they have inherited. Be it said however to the praise of the inhabitants of the Basse Pyrenees, the men instead of the women perform the labors of the field. Why is this? Simply because they have a better and more advanced civilization, for which they are mainly indebted to King Henry of Navarre, and to Margaret of Valois, who were not too bigoted even in those rude times, to listen to those who led the vanguard of freedom from ecclesiastical tyranny and oppression, a work that is now rapidly advancing throughout all Europe, and will continue to advance proportionately as the minds of men begin to think and act upon intelligent and independent convictions.

Pau has a fine old castle, where good King Henry IV. was born, Dec. 13, 1553. The apartments are grand, and, strange to say, cheerful—a comfort which is usually wanting in all other kingly palaces that I have visited. The royal bed, and the tortoise shell cradle wherein His Highness was rocked, are still preserved among the curiosities of the castle. From the high tower where Margaret of Valois gave asylum to John Calvin, and listened to his stern preaching, a grand view is had of the Pyrenees and surrounding country. An other old tower was used alternately to imprison Romanists and Reformers, but history does not inform us that "pure religion and undefiled" was ever advanced by prisons and persecutions. Pau, which ranks as one of the healthiest spots in Europe, is a place of great resort for consumptives. Their wasted, tottering frames are seen moving about the streets, receiving temporary inspiration from the bracing air, but only to add, it may be, a few more days to their lives. The constant presence of so many "sick, lame, halt, and blind," in this beautiful and healthful spot, of course detracts from its pleasures to those who, more happily circumstanced, might desire to remain and enjoy the fine scenery and the charming excursions through the neighboring mountains. A few miles beyond Bayonne we stopped at the old town of St. Jean de Luz, where Louis XIV. married Maria Therese, the Infanta of Spain, daughter of Philip IV., in 1660. In honor of this event, the authorities of the town closed the door through which the royal pair entered, and it has remained shut ever since. The inhabitants are delighted to show the house where their Majesties passed the bridal night, previous to setting out for Paris.

Returning to Bayonne, the birthplace of the bayonet, a strongly fortified city, the key to the passes of the Pyrenees on the west, we took a carriage and rode over to Bairritz, a distance of six miles, the imperial salt watering place, where the Empress Eugénie and her husband Louis have a fine villa close to the seashore. The Empress has also erected a little chapel within the enclosure of the surrounding grounds, and is very justly regarded by the people as a kind-hearted and pious lady The splendid and well shaded roadway was thronged with mules and donkeys, with immense panniers thrown across their backs, and it was no uncommon sight to see a female seated upon these venerable animals, with her feet hanging astride the neck. A donkey, when thoroughly loaded as I have frequently seen them, affords a most grotesque sight, as often under a pile of bags or brush, nothing of his corporeal frame is visible except the ears, nose and feet.

At the poor, miserable town of Irum, we reached the Spanish frontier, where baggage is searched and cars are changed. The gage of the Spanish railway is a few inches broader than the French, so constructed in order to prevent the running of cars across the border in time of war. The examination of the Spanish officials is very strict, and an armed guard is maintained at all the stations, who search the trains, and lynx-eye all the passengers to discover concealed weapons, and, if possible, to detect revolutionary design. After a delay of an hour and a half, we set out on our journey toward the interior, thankful that we had escaped with so little annoyance. We were permitted to enjoy the complaisance, however, but for a brief period, for on reaching Miranda, a station some six hours journey from Irum, our baggage was again thrown out of the car, and underwent another examination, and one of the guards entered our car and commenced searching under the seats and carpets, and ended his investigation by pounding vigorously upon the cushions and upholstery. Nothing of a warlike character being discovered, we were permitted to pursue our journey in peace until we halted for the night. The recent attempt at revolution in Spain has excited the authorities to an excessive vigilance, and strangers are looked upon with suspicion. The night of our arrival at Burgos, the train bound for Paris was attacked by a band of brigands, who expected to plunder a large amount of bullion belonging to the government, but they missed the prize. The engineer, however, was killed, and some depredations were committed upon the passengers. We saw one of the brigands being marched through the streets of Burgos the next day, on his way to prison, escorted by two armed guards.

Our first night's experience in Spain was had at Vitoria, an old, wind-blown, weather-beaten city, containing about seventeen thousand inhabitants. Vitoria is historically celebrated as the spot where the Duke of Wellington, in 1813, encountered the forces under Joseph Bonaparte, who was the acting king of Spain. Joseph was badly whipped and ran off, leaving an enormous amount of plunder in the hands of the Iron Duke. This victory resulted in the final expulsion of the French from Spain. The town has the usual Spanish Plaza, with very narrow streets, which emit the foulest odors, through open gratings of cesspools that receive all the sewerage of the houses, without the necessary draining. No carriages or vehicles of any sort are seen upon the streets, except a few ox-carts, having solid wooden wheels bound by a thick iron tire, and a few iron straps on the sides. In some cases a thick wooden rim, or double felly, secured by pins, is used in place of iron. The water necessary for domestic purposes is collected at the public fountain in the Plaza, in large water jugs, such as the woman of Samaria brought to the well, and these are carried either upon the heads of women or the backs of donkeys. The priests are numerous, and are are really the only fine looking men I have yet seen in Spain. They have usually pleasant, intelligent faces, and walk about the streets with great dignity, clothed in their flowing black cassocks and broad-brimmed, turned-up hats. They enjoy the cigarette, and in one instance we noticed a group of them descending the steps of San Miguel after morning mass, puffing the smoke of these little paper rolls. The moment the Spanish territory is entered, the observing traveller notices a complete change, not only of language but also in the appearance of the people, manners and customs, as well as in the character of the country itself. The French are gay,

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light-hearted and cheerful and fond of amusement, and particularly polite and attentive to strangers. The Spaniard, muffled within the folds of a huge cloak, appears dull and taciturn, and being naturally suspicious, he seems reserved and manifests no interest in what is going on around him.

The towns are a fitting type of the Spanish character, and many of them have stood unchanged for centuries, apparently unconscious of the stirring activities in the world beyond, but steam and electricity have at last crossed the Pyrenees, and entered these abodes of mournful desolation, and sooner or later a newer and better civilization will reanimate them into a new existence.

The people pride themselves upon their ancestral renown, and in the Basque Provinces they claim to be the descendants of Noah and Tubal. Their antiquity is well attested by the rudeness of their agriculture and the few, uncouth implements which they employ. The plow is made of the trunk of a crooked tree with a lower branch sharpened and faced with a thin sheet of iron. The trunk forms the beam, and lies obliquely between the heads of the mules or oxen, no chains or traces being used. Heavy, ugly-looking stuffed collars are placed upon the necks of the mules, in front of which there is also a strong wooden yoke, similar to an ox yoke, but instead of bows it is provided with two long wooden pins at each end, to prevent it from slipping off the neck. This yoke is then fastened to the plow beam, or to a cart tongue, by means of a long rope twisted several times around both and then passed under the fore legs of the animals; and thus equiped the plowman holds in his right hand the upturned end, which forms a handle, and with whip in the other, the soil is thinly skimmed over, and after the corn is planted, I should judge from its sickly appearance and the thick covering of grass upon the ground that it was left to take care of itself. In some portions of Spain the plow is not used to open the green sward. It is not sufficiently heavy for that purpose, but the labor is done by men working in gangs, who use a heavy, long-tined fork or spade, which is raised above the head and forced down into the turf. They all raise the implement at the same moment, and throw it violently into the ground. Women usually follow with hoes, to break the clods—truly a curious sight, and an evidence that their claim to relationship with Noah is tolerably well founded.

The topographical character of northern Spain is somewhat peculiar. It is interspersed with bare, desolate-looking mountains, scattered about in promiscuous disorder; timberless, fenceless plains, and some apparently fertile valleys; poor villages of low stone houses or huts, covered with red tile—windows often without glass; a huge church of rough stone wholly destitute of architectural symetry and effect; peasants dressed in fancy costume; men, women, priests, donkeys, dogs, and hogs make up the picture of a country nowhere better portrayed than by their own author of Don Quixote and Gil Blas. The domestic architecture of Spain belongs to a ruder age, but the country is especially distinguished for the grandeur and magnificence of its ecclesiastical edifices, as also for its many interesting remnants of walls, towers, and fortifications of the Roman, Moorish, Gothic, and Castilian periods. For example, in the dull, decayed old city of Burgos, a place of less than twenty thousand inhabitants, there is an old cathedral erected by King St. Ferdinand in the thirteenth century, which is one of the most sublime Gothic structures to be found in Europe, and strikes the mind of every beholder with wonder and astonishment. The exterior effect of this noble building is much injured by its unfavorable location and the mean buildings which have been erected close to its side walls. Nevertheless the principal front is excedingly fine and the spires and pinnacles rise most beautifully in richly carved open work, so that on a clear night the stars may be seen glittering through them. The interior is in the form of a Latin cross, 300 feet long, 213 feet wide, and 193 feet high. Independent of the magnificent central nave with its elaborate ornamentation and fine retalbo, or high altar, there are two lateral naves and fifteen distinct chapels, some of which are as large as an ordinary church; besides these there are also extensive cloisters, and other church appurtenances, the whole containing fine tombs, sculptures, and paintings of ancient date.

At the time of our visit morning mass was being celebrated in all the chapels and also at the high altar by upward of twenty priests and groups of worshippers, chiefly women veiled in black, were kneeling upon the cold marble pavements, and so far as the outward eye could descern they were offering up devout prayer either at the shrine of the Virgin or before a carved embodiment of a suffering God.

There are several very curious relics in this cathedral which are held in high veneration by the inhabitants of Burgos. For instance they have the Christo de Burgos, a wooden image of Christ which was, according to their traditions, carved by Nicodemus, a ruler of the Jews, shortly after he and Joseph of Arimathea had buried our Lord. It was rescued from a box found floating in the sea. The hair, beard, eyelashes and thorns are real, and the image is said to sweat on Fridays, and even to bleed on certain occasions. The image is dressed up in an embroidered petticoat after the modern fashion. There is also an image of St. Cecelia, a recumbent figure, to which is ascribed the special virtue of curing aches and pains about the head. The devotees of this saint bring their tresses to the shrine under the belief that by so doing they will be cured of the headache. This faith in the virtues of a wooden saint is much more sensible than the more common one that resorts to the advertised nostrums of quacks, which flourishes no where so extensively as in our own country. Here is also to be seen the famous old trunk of Mio Cid, the legendary hero and poet of Spain, who being short of money to prosecute his campaign against Valencia resorted to the sharp financial dodge of filling the box with sand and pledging it as so much gold to the Jews for a liberal loan of hard cash. The bones of the Cid and of his faithful heroic wife Jimena are carefully preserved in a walnut case. The dust is corked up in a beer bottle and is shown to strangers in a room fitted up as a chapel in the old town hall. In this same building is also preserved the first throne of the kings of Castile, a very common old wooden arm chair. Burgos has several very extensive monasteries and convents which are no longer permitted to flourish in Spain as in former times.

At Valladolid, formerly the capitol of Castile, once an imperial city, now much reduced in circumstances, we visited the old house where Christopher Columbus died May 20, 1506. It is a plain two-story building, stucco front the lower story striped to imitate stone, the upper painted to imitate columns with scroll work capitals. On the outside just above the door a carefully sculptured medallion has been inserted which represents the head of Columbus, a globe, anchor, scroll, and a horn of plenty. Underneath are the words "*Aqui Murio Colon*," "Here died Columbus." A large old building called the Audiencia, now used as a court house, contains the room where Ferdinand and Isabella were married Oct. 18, 1469. It is a very plain apartment with an altar at one end before which it is supposed that the royal couple pledged their marriage vows. Phillip the II., of Spain, was also born here in an old brick palace now deserted and opposite to this is the house once owned and occupied by the learned Gondomar, who was ambassador of Philip IV. to the Court of James I., King of England. The poor old dwelling of Cervantes, author of Don Quixote, is one of the lions of the place and bears his sculptured head. Valladolid is an interesting spot to all Americans, but very few even of those who travel in Spain ever take the trouble to visit it. Like many other Spanish cities its ancient glory has departed, and it appears to have retired from active business.

The railway between Irun and Madrid is a stupendous piece of engineering, and but for the enterprise, skill, and capital of a French company, Spain would have remained isolated, a sort of political fossil whose glory reverts to the buried centuries of the past.

There are upward of seventy tunnels on the line, of which one that pierces the Guardarama mountains is three thousand feet in length, cut through granite mixed with gneiss and other crystaline schists. The cars are comfortable and good order and regularity are as well maintained as upon European lines, in spite of the grumbling tourists and letter writers of England, who, according to John Murray, do more growling than any other traveller.

S. H. W.

### The Patent Office.

With the additional force of newly-appointed examiners, and the extra hours of duty performed by all the examiners, the accumulated work of the Patent Office has been nearly brought up. There are now but few classes that are more than a few weeks behind in examination, while most of the rooms are entirely cleared of back cases.

As an indication of the enterprise of the Patent Office, see the long list of patents reported in these columns every week. We received from Washington by a single mail last week official circulars of allowance of FIFTY-ONE patents, all solicited through this office.

## MANUFACTURING, MINING, AND RAILROAD ITEMS.

The percentage of female operatives to males, in all the mechanical operations carried on in this city, is 37·18; in Philadelphia, 44·81.

It is stated that Mr. Winans of this country has proposed to buy the Moscow railroad, so long in the market and recently offered to the Russo-French company by the Government. He is willing to pay 25,000,000 roubles ($19,700,000) within a year, besides undertaking to amortize a former loan.

The Turkish government is trying to turn to account its forests and mines but the want of means of communication in the interior is an almost insurmountable barrier, So in spite of the great mineral wealth of the country no one will take the mines. One forrest district in Bosnia has been however sold, and is expected to yield $100,000,

Operations on the railroad which is being built to the summit of Mount Washington have ceased for the season. A new company have been organized fixing the capital at $200,000. A little over a mile of the road has been constructed and it is expected that the balance will be finished next year.

Creusot employs 9,950 workpeople. The blast furnaces there turn out 130,000 tuns of pig iron annually, while the forges produce 100,000 tuns of wrought iron in the same period.

In the ordinary method of manufacturing alloys of copper and zinc, the copper is first melted and into the molton mass the zinc is introduced in a solid state. By a late English patent it is proposed to melt both metals, pour the melted zinc into a ladle situated near the melting furnace, and afterwads pour the melted copper into the same vessel, the mixture is then stirred, and the combination takes place, the heat which is evolved in the act, raising the sensible temperature of the alloy and preventing the undue cooling which would result but for the said evolution.

A Mr. Sibert of Staunton, Va., has, it is stated discovered a process for converting iron ore directly into cast steel by a single operation in an ordinary furnace. This gentleman is now laying a number of steel rails made by this process on the track at Staunton and we may hear more from them hereafter.

Since the closing of the war the gold field of Georgia is again engaging attention. In former years the yield of gold was so large that Government established a mint at Dahlonega, Lumpkin county, in the western part of the State. Orders have been recently given to have this mint which was necessarily closed during the war, opened again. Three large ingots of gold from the Levis gold mine valued at $4,500 the product of one week's work at the cost of $1,100 were recently exhibited in Washington.

The process of galvanizing iron, as practiced in one of the leading establishments of Philadelphia is as follows:—Selected sheets of iron after being trimmed to requisite size and cleaned by a weak acid solution, are rolled smooth, then dried in an oven and each sheet placed in contact with zinc. Both metals are raised to unequal heat and thus fusion is effected. The regulation of the heat necessary to metallic combination is a point of nicety and care.

The highest elevation ever reached by the railroad is a point on the Pacific road, 8,240 feet above the ocean level or more than four thousand feet higher than the summit of Mount Cenis.

Twelve hundred tuns of steel rails have been substituted for iron ones on the Boston and Providence railroad. At Roxbury they have been in use for upwards of a year, at a point when one hundred and twenty trains or locomotives pass over them daily but there is as yet no perceptible wearing away. Iron rails had to be relaid seventeen times a year at the same place.

The rapid growth of the town of St. James, in Missouri, shows what railroads are now doing in developing the country. St. James, on the line of the Southwest Pacific Railroad, was laid out in 1830, but owing to the war but few buildings were erected for several years. In 1866 the population amounted to about 1,300. Within a year past there have been erected, or put under contract, as many new buildings as the town contained last year.

About 25 miles from Santa Fe, New Mexico, is an extensive bed of coal which has been pronounced by experts true anthracite, and is so far as yet discovered the only anthracite deposits west of the Alleghany mountains.

Not less than thirty thousand French Artizans are employed in the manufacture of artificial flowers, and the trade in this line amounts in value to $3,000,000 every year. America is the best customer of France in the articles, demanding in the same time $1,000,000 while $800,000 worth finds a market in Prussia. England consumes $600,000 worth, Germany is a customer to the extent of $400,000, and Italy for somewhat less.

## Recent American and Foreign Patents.

*Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.*

LEACHING TAN BARK.—Charles Korn, Wurtsborough, N. Y.—This invention relates to a new apparatus for leaching tan bark and consists in the use of a vat which is provided with various compartments which are connected in such a manner that the tanning liquid will continually circulate through the same in any required order or succession.

STEAM VALVE.—R.A. Filkins, North Adams, Mass.—This invention relates to a conical valve which has a perfectly smooth lower base or face and which rests on a seat in which the channels for the steam passage are arranged. A passage is provided in the valve which when brought in line with the steam pipe connects the two parts of the same while otherwise it can be so set that the passage will be completely or partly interrupted as may be desired.

WATER INDICATOR FOR STEAM BOILERS.—R. A. Filkins, North Adams Mass.—This invention relates to a device by which the hight of the water in a steam boiler can be instantly ascertained without the use of faucets or taps and which, when the water in the boiler descends below a certain line, will blow an alarm whistle and notify the attendants of the fact

PLUMBERS' AND PAINTERS' LAMP.—George Wanier, New York city.—This invention relates to a new lamp for creating a powerful flame similar to that produced by means of the ordinary blow pipe. Its object is to have a self-acting blow pipe and to produce a flame which can be used by painters for burning old paint on doors, etc., prior to applying the fresh paint.

DISTILLING APPARATUS.—Theodore Gründmann, Cleveland, Ohio.—This invention relates to a new and simple device for distilling, condensing and cooling mash, beer, cider or other suitable liquid adaptable more particularly for distilling on a small scale. The invention consists in arranging above the retort a small vessel into which the vapors pass and whence they are conducted to the cooler.

SCAFFOLD.—Clark Robinson, Rochester, Minn.—This invention relates to a portable scaffold which is to be used by painters, carpenters and masons, and which can be raised or lowered at will to any desired hight by the parties standing upon the platform of the scaffold.

CARRIAGE.—Ephraim Soper, New York city.—This invention relates to a new construction of the front support of carriages and its object is to allow the application of C-springs to the front part of carriages and also the strengthening of the top bed and upper transome plate. The invention consists chiefly in the use of a front perch which is secured or swivelled to the back bar and extends to the under side of the carriage to which it is pivoted, thus doing away with the through perch and still permitting the use of C-springs which are fastened to the back bar and top bed and from which the front end of the carriage body is suspended,

DOOR SPRING.—Josiah J. Mackey, South Brooklyn, N. Y.—This invention relates to a new and improved application of a spring to doors for the purpose of preventing the slamming of the same as they close.

MACHINE FOR STACKING HAY.—William Louden. Fairfield, Iowa.—This invention relates to a new and improved device for stacking hay whereby several important advantages are obtained over other devices hitherto devised for the purpose and a great saving in labor effected.

SPINDLE BOLSTER.—Francis A. Sterry, Canton, Mass.—This invention consists in forming an annular recess in the top part of the bolster in which is placed an absorbent for the oil and also in cutting slits through the central portion of the bolster through which the lubricating oil passes to the spindle.

HOLDER FOR HORSES.—John P. Reynolds, Mirabile, Mo.—The present invention relates to a holder for horses while being shod which holder is constructed in such a manner and so applied to the horse as to occasion no injury to him and without the least danger of accident or injury to the person operating upon or shoeing the horse.

TAG.—Frederick G. Sargent and Norman H. Bruce, Graniteville, Mass.—This invention consists in so preparing such surfaces of the said metal wire as are in contact and held by the folded over paper with a coating or covering of paint or fibrous or other material suitable to allow the said wire and card paper to become firmly united and joined together with the use of glue or gluten or other proper adhesive material, and also to enable the string around such wire or metal to be similarly fastened thereto.

LIFE PRESERVER.—D. H. Heyen, New York city,—This invention consists in combining an elastic air-tight tube with a broad substantial belt thereby effectually protecting the air tube from injury and rendering its application to the purpose intended much more easy than where air tubes or vessels are attached directly to the body of life preservers without such support.

COMBINATION OF AN ALARM AND LOCK.—Ezekiel Tracy, Kanzas City, Mo.—The present invention consists in so combining an alarm with a lock and arranging it in connection therewith that in unlocking the lock an alarm will be set free and sounded and thus the approach or entrance of burglars or other parties indicated to the occupants of the premises or room where the lock is applied.

PESSARY OR SUPPORT FOR THE UTERUS.—Mrs. Emiline T. Brigham, Philadelphia, Pa.—This invention consists in combining with a pessary which may be made of india-rubber or any other suitable material of the proper shape a coiled, spiral or other suitable-shaped spring support of a length sufficient to pass through and out of of the mouth of the vagina where at its outer endit is secured to the person by straps or other suitable fastening or holding means or devices. The object of the spring support is to hold the pessary against and about the mouth and neck of the uterus and thus to support the same, the spring shape causing it to produce an elastic support thereto and one most comfortable and easy to the wearer.

DOUGH KNEADING MACHINE.—Samuel Emmore, Stouchburgh, Pa.—This invention relates to a new machine for mixing and working dough, and consists in the use of an axle provided with stirrers; a screw thread is formed near one end of the axle, at one bearing, so that when it is revolved it will receive a combined intermittant, rotary and reciprocating motion.

HITCHING STRAP.—Thomas B. Chambers, Newtown, Pa.—This invention relates to a new manner of arranging the strap for hitching horses to posts, or other stationary devices, and consists in the use of a chain or strap, secured with its ends to the rings of the bridle. The hitching strap, which is fastened to the halter, is passed through this chain or strap, and is tied to the post.

TRANSMITTING AND CONVERTING MOTION.—Nathaniel Thompson, Farmington, Mich.—This invention relates to a new and improved means for transmitting and converting motion, a reciprocating motion being converted into a rotary one, and *vice versa*. The invention is an improvement on the double rack and pinion, which is an old and well known means for imperfectly effecting the result specified, but which by this improvement is made to operate in a satisfactory manner.

SCREEN-GUARD ATTACHMENT FOR CULTIVATOR PLOWS.—G. Brain, Springfield, Ohio.—This invention relates to a new and improved screen-guard attachment for cultivator plows, whereby clods of earth are prevented from being thrown upon the plants, and a greater or less quantity of fine earth thrown upon or around them, as may be required.

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TRUCK.—Wm. P. F. Beggs, Philadelphia, Pa.—This invention relates to a new truck, which is so arranged that its front running gear can be turned short, although its platform is quite low. The invention consists in dividing the truck platform into two parts, of which one forms the main platform, resting upon the rear axle, while the other part is secured upon the fifth wheel, and holds the king-bolt, in the ordinary manner.

THILL COUPLING.—James P. Collins, Troy, N. Y.—This invention relates to a new and improved mode of securing thills to axles, whereby a very strong and durable connection is obtained, and one which will admit of the thills being very readily attached to and detached from the axle, all play and rattle and casual detachment of the thills avoided.

BALING PRESS.—Jackson Gorham, Bairdstown, Ga.—This invention relates to a new and improved baling press, of that class in which the platin is operated by means of levers arranged on the toggle principle. The invention consists in a modification of the construction of the arms of the levers, and also in a novel manner of attaching the rope of the levers to the operating or driving shaft.

MILL PICK.—Uzziel Stewart, Berlin, Wis.—This invention relates to a new and improved mill pick, of that class which are provided with an adjustable cutter. The invention consists in a novel construction of the pick and the manner of securing the cutter in the stock thereof, whereby the cutter may, with the greatest facility, be adjusted to compensate for wear.

LAMP CHIMNEY.—E. B. Requa, Jersey City, N. J.—This invention consists in a new and improved shape or form of the chimney, whereby the same is kept at an equal distance from the flame all around, and the usual contraction of the chimney above the flame avoided, whereby the chimney is subjected to a uniform degree of heat all around, and the liability to breakage greatly reduced.

CLOTHES WASHING MACHINE.—Eli Hunt, Shelburn, Ind.—This invention relates to a new and improved clothes washing machine, of that class which are provided with a rotary clothes receptacle. The invention consists in placing a rotary clothes receptacle, having a periphery compcsed of slats and provided internally with lifters; the clothes receptacle being placed within a suitable suds box and arranged in such a manner that the clothes, as the receptacle is rotated, will be passed through the suds, raised or lifted out therefrom, and allowed to drop from the top of the receptacle into the suds, to be again passed through it, which operation effectually cleanses the clothes.

CULTIVATOR.—Jared W. Sanford, Byron, Ill.—This invention relates to a new and improved cultivator, designed for general purposes, so as to be capable of perfoming all the various kinds of work now done by cultivators. The invention consists in a peculiar construction and arrangement of parts, wherby the end above specified, with a strong, ecomical and durable implement, is obtained.

MEDICATED BALSAM COMPOSITION.—L. F. Griffin, New York city.—This invention relates to a new and useful medical composition for curing sprains, bruises, swellings, sore throats, pains in the side and limbs, weakness of the back, ague in the face and breast, rheumatism, gout, neuralgia, and other affections.

GRADING AND EXCAVATING.—T. C. Hammond, Nicolaus, Cal.—This invention relates to an improved grading and excavating machine, and is intended for the grading of road beds for wagons and railroads, and for embankments to be used as dykes or levees for the reclamation of overflowed lands. It is also adapted to the excavation of open cuts for road beds, and to the excavation of canals and ditches for drainage, irrigation, and navigation purposes.

HOISTING DEVICE FOR TRUCKS.—Nathan Albertson, Plainfield, Ind —This invention relates to a new and useful improvement in a device for raising logs, rocks, or other heavy objects, to be moved on a truck.

ATTACHMENT TO CARRIAGES.—Jackson Gorham, Bairdstown, Ga.—The present invention relates to an attachment to carriages, or more especially buggies, the object of which is to simplify the fastening of the traces and hold-back strap thereto, and the unfastening of the same therefrom, which result is satisfactorily accomplished.

PILL AND OTHER BOXES.—George H. Hawkins, New York city.—This invention has for its object to furnish an improved box for containing pills and other things, which shall be simple in construction, more reliable in use, and manufactured at less expense than the ordinary paper boxes now in use for such purposes.

FLOUEING MACHINERY.—Martin Cosgro, Peoria, Ill,—This invention has for its object to improve the construction of flouring machinery so as to take out the fine bran and red particles from the flour while passing through the bolt.

PORTABLE DERRICK.—Chatham B. Wright, Belmont, Ohio.—This invention is designed to improve the construction of portable derricks, intended more particularly for stacking hay, so that they may be more convenient and effective in operation, the derrick revolving automatically to carry the hay over the stack and to return the empty fork to its former position.

ROTARY PUMP.—John Poppe, Greenpoint, N. Y.—This invention has for its object to furnish an improved rotary pump, designed especially for use on shipboard, but equally applicable for use in other places, and which shall be simple in construction, effective in operation, and not liable to get out of order.

SPRING BED BOTTOM.—D. G. Chapin, Galena, Ill.—This invention relates to a spring bed bottom, and consists in the means adopted for fastening the coil to the slats.

LOG WAGONS, CARTS, AND SLEDS.—G. S. Pigott, Central Station, West Va.—This invention relates to an improved log wagon, cart, or sled, and consists in an upright frame arranged on the axletree or roller of a common log wagon or cart or on the cross piece of a sled.

CRANE.—A. L. Batten, Topsham, Vt.—This invention relates to an improved crane specially designed for the purpose of taking sugar pans from the arch. It consists of a gallows crane set in a convenient position in the sugar factory, so that its arm may extend over the pans on the arch, and capable of being swung round to any position desired.

WHEEL.—Julius M. Bailey, Indianapolis, Ind.—This invention relates to an improvement in wheels, and consists in the employment of a wedge-shaped piece of metal keying between the felleys and secured to the tire by a screw bolt, by screwing on which the tire can be tightened on the rim of the wheel; also of a bed or socket wherein the end of the spoke can be stepped and a wedge driven home to tighten the spoke as it gets loose.

TEA KETTLE WITH A SWINGING LID.—C. C. & S. J. Hare, Louisville, Ky.—This invention relates to a new and useful device for attaching a swinging lid to a tea kettle, and consists in connecting the lid to the kettle by a pivot on one side with a curved slot in the lid fitted on the ear of the kettle, so that it shall be held in place by the bail and turn either way horizontally, for the purpose of opening and closing the kettle.

BLEACHING VEGETABLE OILS.—Theodore Leonhard, Paterson, N. J,—This invention relates to a new and improved method of treating linseed and other vegetable oils in the process of bleaching and preparing the same for paint and other purposes.

SAFETY POCKET AND CLASP.—Joseph Colton, New Orleans, La,—This invention relates to a new and useful device for protecting money, watches, and other articles of value from the depredations of pickpockets.

PORTFOLIO FOR NEWSPAPERS, PERIODICALS, MUSIC, ETC.—John C. Clarke, Jersey City, N. J.—This invention has for its object to furnish an improved portfolio, so constructed and arranged that the periodicals, etc., may be easily attached, securely held, and readily removed when desired.

LACING FOR BELTS.—David P. Davis, New York city.—The present invention relates to an improved lacing, more especially intended for machine belts and bands, and the lacing is composed of two parts of similar construction, with each part formed of a cross bar having a series of arms made of a hook shape at their outer ends, so that the parts can be interlocked together, the hooks of one part with the cross bar of the other, and thus if by their arms they are passed through suitable slits or openings made at the proper points in the belt at or near its ends, the two ends of the belt will thereby be secured or fastened together, and in such a manner as to bring the strain upon the lacing through the thickness of the belt, in lieu of in the direction of its length and that of the slits through which the arms to the fastener pass

WATER ELEVATOR.—H. Norris, Spencer, N. Y.—The water elevator embraced in the present invention consists of a reservoir placed at the bottom of a well or cistern, but with a space below sufficient for the water to pass into it, connecting with which reservoir is a tube extending up to the top of the well, where it is provided with a suitable discharge nozzle or spout. This reservoir is provided with a loose and movable bottom having in its center a valve plug of sufficient weight to fall through the bottom, which valve plug is provided with a rod or stem extending up through the center tube to its upper end, where through a chain or other line hung to it and passing around a pulley, turning in suitable supports, it is connected to and with a treadle lever.

MUSKETO NETS FOR WINDOW BLINDS.—George W. Miles, Philadelphia, Pa.—This invention relates to an improvement in the arrangement of a musketo net or gauze in connection with a window blind for the purpose of excluding musketoes, flies, and bugs without interfering with ventilation.

MACHINE FOR IRONING OR SMOOTHING CLOTHES, TEXTILE FABRICS, ETC.—C. R. Hoyt, East New York.—In the machine embraced by the present invention the clothes or fabrics to be ironed or smoothed are properly laid upon an endless traveling apron or belt, and by it carried to the ironing roller employed for smoothing the same, which roller is heated in any suitable manner, the frame in which the endless travelling apron is arranged and moves, being so hung that when desired in consequence of the seams in the garments or for any other reason, it can be depressed sufficiently to relieve such portions of the garments from the pressure of the ironing roller, without interfering, with the travel of the endless apron.

WOOL CARDING MACHINE.—S. C, Philbrick, Rockville, Conn.—This invention relates to improvements in the construction of card machinery and consists in applying additional rolls in connection with the first breaker cards and changing the position and run of the clothing in one of the feed rolls, whereby the machinery is rendered much more effective in operation.

ANIMAL EXTERMINATOR.—M. V. Nobles, Elmyra, N. Y.—This invention relates to a new and improved method of exterminating the animals or vermin which infest dwellings or buildings, or which pray upon vegetation, or which are in any manner a source of damage or annoyance to housekeepers, farmers, horticulturists, or others.

SASH SUPPORTER AND FASTENER.—James R. Hall, Georgetown, Ill.—The present invention consists in a simple and novel attachment to sash or window frames for the support and fastening of the sash thereon, at any desired point in its play or movement.

MARINE CLOCK.—A. J. Goodrich, Waterbury, Conn.—The present invention relates to the movement regulator of marine clocks, and it consists in making the same of one piece in lieu of three, as heretofore, the advantages of which are that it is more simple and more durable than the three part regulator; cannot get out of repair unless broken; is easily made, there being no holes to drill, no wire to be straightened and cut, or welding to be done.

EXHAUST FOR MILL STONES.—David Baird, Bloody Run, Pa.—In this invention the hot air, etc., is exhausted from around the mill stones, through a pipe in which a current of air is established by a fan.

MILL STONE DRESS.—A. N. Garland, West Charleston, Vt.—In this invention the furrows are made wide, shallow, and smooth, one edge being cut clear and sharp. Between the furrows, the surface near the center of the stone is smooth, and at other parts of the stone is cut like the face of a file. A new method of bosoming the stone is also used.

SNOW PLOW AND TRACK CLEARER.—Michael J. Cogin, and M. E. Russell, Mobile, Ala.—The object of this invention is to furnish a cheap and effective arrangement for clearing the track of snow and other similar obstructions, which can be attached to any car and adjusted, regulated, and operated by persons on the car.

CHIMNEY.—E. S. Phelps, Jr., Wyanet, Ill.—This invention relates to chimneys used in connection with stoves or furnaces, and consists in providing a new support and means of cleaning such chimneys.

CASTING METALLIC PIPES.—Benj. S. Benson, Baltimore, Md.—This invention consists in the use of an anchor of improved form and construction, which does not scratch or wear the mold.

YARD MEASURE.—Joseph Douglass, McConnellstown, Pa.—This yard stick has a handle at one end, and two projecting flanges, which mark the terminations of the measure, which may be a yard, a foot, or other distance, within the reach of the expanded arms.

PLOW.—S. T. Denise, Red Bank, N. J.—In this invention an inverted conical roller, in front of the mold board, and above the plow point, is rotated on its vertical axis by means of a small roller gearing with it, under the plow.

COMPOSITION FOR COVERING WOODEN BUILDINGS, BRIDGES, ETC.—Joseph Heckel, Decatur, Ill.—The composition which is the subject of this invention is designed to render wooden structures fire proof, and to protect them from the action of water and of the weather. It is also designed to be used as a paint, instead of white lead paint.

MILL SET.—T. C. Ball, Bellow Falls, Vt.—In this invention, which is designed for circular saw mills, a table slides back and forth under the head block, having a rail attached to its upper surface, which slides between two pins, projecting downward from the knee. The rail, being inclined at an angle of thirty or forty degrees from the perpendicular to the head block, causes the knees to advance or recede as the table moves in one direction or the other. Several of these tables are connected by a rod, which is operated by a novel reversing arrangment.

## Answers to Correspondents.

*CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.*

*SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisemets at 50 cents a line, under the head of "Business and Personal."*

☞ *All reference to back numbers should be by volume and page.*

J. I., of N. Y., asks what will remove nitric acid stains from the hands. Soap and Indian meal bran or pumice stone with rubbing.

J. H., of Mass., replies to the question of S. A. G., of Ind., in No. 22, current volume, how to procure a bright deposit in electro-plating, "A French authority says: Add to the silver bath sulphuret of carbon or an alkaline sulphuret which will cause the silver deposit to be as brilliant as if carefully burnished."

J. M. S., of Ky.—"What is the best recipe for painting a blackboard on a plastered wall?" Lampblack from which the grease has been burned mixed with benzine or turpentine will serve the purpose. Oil or Japan in the paint will give a gloss and make the board too smooth, neither of which is wanted. A blackboard should be of a dull lusterless black.

S. F. G., of Conn.—"What is the average indicated horse-power of the best locomotives, such as are employed on passenger trains; what do they weigh and what amount of water is evaporated per hour?". Passenger engines of abont 33 tuns weight of good design and in good order have run off from 750 to 800 I. H. P., and will boil off or evaporate about 8,000 lbs of water per hour.

W. W. McM., of Ala., says:—"I want some information in regard to the link motion. What is the rule, if any, to find the throw o the eccentric, the lap of valve over the ports, and the required travel of valve to cut off at any point in the stroke to as short as six inches?" The best plan in order to become practically acquainted with the properties and peculiarities of the link motion is to lay it down, valve and all, full size, on a drawing board. Or, better still, to make pasteboard or wooden models from which may be obtained any measurement desired.

D. W. S., of Robesonia Furnace, says.—"Our hot oven contains 50 pipes through which the blast is forced into the stack. The oven is heated to 600° and the blast is supposed, after passing through the 50 pipes, to leave the oven at the same temperature. Now will doubling the number of pipes without increasing the temperature of the oven increase the heat of the blast after passing through the oven?" If your blast, after passing through the 50 pipes of your oven is heated to 600°, which is also the temperature of the oven, no further elevation of temperature of the air is possible except by increasing that of the oven; hence, if you increase the number of pipes nothing is gained. But we do not think the blast is as hot as the oven; its temperature may be raised by increasing the heating area over which it must pass before entering the furnace.

J. P. J., of Mass.—"Blow holes" in iron castings can be filled with a mixture of lead, 9; antimony, 2; and bismuth, 1. This resembles cast iron in color and expands in cooling.

H S., of Ohio, asks how mill or other saws can be repaired and asks if silver solder will do. We have seen a large muley saw which was broken soldered with the following composition: Silver, 19 pennyweights; copper, 1; soft brass, 2, melted under a coat of charcoal dust.

O. A. F., of N. Y.—"Will 120 degrees fire test petroleum burn longer than that of 110°? Will an alcohol lamp placed in an air-tight vessel continue to burn until it burns out all the oxygen? How far will a common wooden pump draw water and have the water follow up the sucker (movable valve box), as fast as the lever was forced down measuring from the sucker to the surface of the water?" Oil of a high fire test is heavier than one of a lower grade and will burn longer in a lamp. . .An alcohol lamp burning in a close receiver will be extinguished before it exhausts all the oxygen. . , The pressure of the atmosphere at the sea level will raise a column of water about 33 feet; the kind of material in which the column is contained not affecting the result.

J. C. D., of N. H.—"How can I soften ivory to color and press it into molds?" In three ounces of nitric acid mixed with fifteen ounces of water put the ivory to soak. In three or four days the ivory will be soft.

W. S. P., of N. Y.—"Can you give me a recipe for coloring gut strings (as those used on a harp) black or red?' We know of no way of dyeing them without injury to the material. Probably a varnish or paint would serve the purpose.

J. H., of Mass., asks how he can deposit gold and procure a rich color without the brassy appearance which he at present obtains. If the plating is on silver and not very thick it will have a light color, as gold when thin is more or less transparent. A deposit of copper before the gold is deposited will give a deeper color; but probably if the gold deposit is thick enough there will be no trouble in producing the proper color without the copper.

C. S., of Minn., asks how he can tin a copper kettle from which the tin has been worn by use. He is so remote from any large place that he cannot get it done. Butt's "Tinman's Manual" says, "boil the copper vessel with a solution of stannate of potassa mixed with tin borings, or boil with tin filings and caustic alkali or cream of tartar. In a few minutes a layer of pure tin will be firmly attached."

I. V. J., of N. Y.—"Can you give me some idea of the method of generating carbonic acid gas such as is used for so-called soda water, with the proportions of material used and gas obtained?" Carbonic acid for soda water is commonly generated by mixing marble dust with an equal weight of sulphuric acid. Marble contains over 40 per cent of carbonic acid. A cubic foot of carbonic acid weighs two ounces.

## Business and Personal.

*The charge for insertion under this head is 50 cents a line.*

Pattern Letters and Figures for inventors, etc., to put on patterns for castings, are made by Knight Brothers, Seneca Falls, N. Y.

Allen & Needles, 41 South Water street, Philadelphia, Manufacturers of Allen's Patent Lamina, for removing and preventing Scale in steam boilers.

For the Best Shingle Machine in use—will average 70 thousand in 11 hours, with one saw, or 140 thousand with two saws. Address Geo. Challoner, Omro, Wis.

Manufacturers of Auger-twisting Machines will please send circulars to Thos. P. Conard, West Grove, Pa.

All Parties having any article to sell through an agent, address, with circular, etc., Box 499 Oil City, Pa.

Toy Manufacturers will please send their address to Edward Fitzki, Quartermaster General's Office, Washington, D. C.

The Patentee of a new rule wishes to make arrangements for its manufacture. Rule and Scale Manufacturers will address Thomas Carter, 81 Third street, Louisville, Ky.

S. W. Gardiner, Newark, N. J., practical machinist, having a shop of good tools, desires to correspond with those who wish work in his line.

To Iron-pipe makers and Gas Fitters—send price lists of cast-iron socket pipes, dry and wet meters, service pipe, etc., to E. Moody, C. E., Omaha, Nebraska. Quantity required large.

Important to Manufacturers—see advertisement on inside page, of Broughton & Moore's valuable patents and tools for sale. Mr. Broughton has patented all his inventions through this office, therefore we know what his inventions are, and can recommend them as practical.—EDS.

Manufacturers of Circular Saws and Turbine Wheels please send circulars and price lists to Abner Hart, Guysboro', Nova Scotia.

A Young Man desires employment in some situation where a good Scientific and Mathematical education, with a knowledge of drafting, of the principles of mechanism, etc., would be of service. Address A. R., Webster, Me.

H. N. Winans, 11 Wall st., New York, an authority on the subject of Incrustations, proposes to save 10 to 30 per cent of fuel and all the expense of cleaning boilers, by using his Boiler Powder, which removes any sized Scale, and prevents new formations. 12 years' use proves it no humbug.

Inventors and Mechanics interested in the wonderful process of reproducing oil paintings by mechanical means should order our "Journal for Popular Art," the first number of which will be mailed free. Address L. Prang & Co., Boston, Publishers of "Prang's American Chromos."

## EXTENSION NOTICES.

A. M. Sawyer, of Athol, Mass., having petitioned for the extension of a patent granted to him the 7th day of March, 1854, for an improvement in machines for splitting rattans, for seven years from the expiration of said patent, which takes place on the 7th day of March, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 17th day of February next.

Warren Gale, of Peekskill, N. Y., having petitioned for the extension of patent granted to them the 7th day of March, 1854, for an improvement in the gage of straw cutters, for seven years from the expiration of said patent which takes place on the 7th day of March, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 17th day February next.

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### Device for Lathe Carriages.

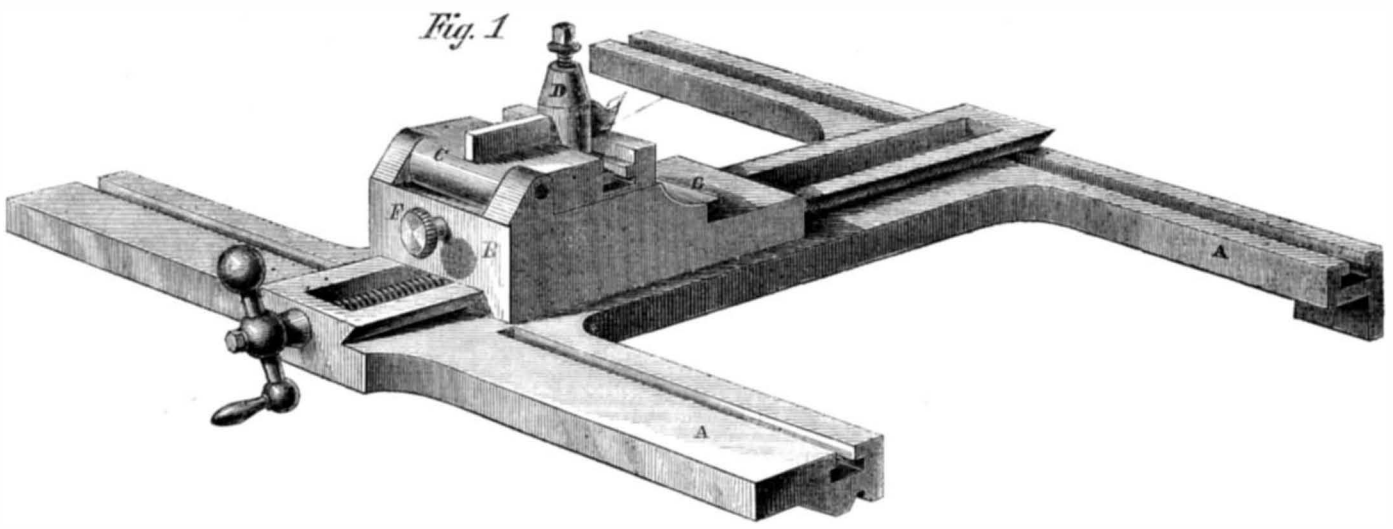
Various devices have been adopted for the purpose of adjusting the tool of a slide lathe, but they have been all more or less defective, and their use has been in most cases abandoned.

The most popular form still in existence is the weighted rest, but the principle is in this erroneous, as steadiness and stiffness must be sacrificed; for weight is all that can be relied upon for keeping the carriage snugly in position on the bed, and in cases where interstices or irregularities occur in turning, the result is anything but satisfactory. Another point which can be urged against this arrangement is the inordinate wear of the bed occasioned by the necessarily augmented weight. This would not be productive of so much evil were it to extend the full length of the bed, but in tools where short work has been done for even a limited time, a very material hollow is perceivable between the sliding points of the carriage, which is ruinous to the accuracy of the machine. These disadvantages have proved themselves so well founded, that numerous leading manufacturers have entirely relinquished the use of a weighted carriage, and now use merely annular wedges, which certainly cannot be charged with the leading defects of the method just commented upon; but what they gain in this respect they lose in awkwardness of their manipulation, and it is only by a series of trials involving time that the desired adjustment can be attained at all.

Now, the device which our engravings represent, seems to preëminently combine all the most desired features; its solidity is not in the least degree impaired by complete control and fine adjustment of the tool point, even when in operation, and it possesses in itself a novelty, in its adaptedness to cutting screws, of so much merit that this alone is sufficient to recommend it. When cutting screws by means of the ordinary rest, the operator is obliged to draw back the rest when the lathe is reversed, in order that the thread or tool may not be injured. Each time the cut is recommenced the same formula must be observed, which, aside from being inconvenient, is disadvantageous, as the accuracy of the feed is interfered with by the alternating movement of the tool to and from the work. The "Improved Rest" is adjusted to the carriage, A, in the ordinary way, B, is of box form within which is fitted the wedge, E, and block, C, wherein the tool post, D, is inserted. C swings at the point, H, and rests upon the wedge, E, which is in turn controlled by the screw, F. G is a guard to keep the dirt from getting under the wedge. Now, it will be seen that when the elevation of the point of the tool, I, is necessary, a turn of the screw, F, pushes the wedge under, C, and produces the required effect; when depression of the tool point is desired, a withdrawal of the wedge by the same means accomplishes it. When it becomes necessary to reverse the lathe, as in cutting screws, it is obvious that the tool will ride on the work quite lightly, swinging on the pin, H (or it may be relieved by hand to the same end), but immediately on recommencing cutting, the tool will engage solidly, and thus only one movement of the feed is requisite, and that always toward the work between the centers.

This invention was patented by Jonathan E. Burdge, August 13, 1867, and the sole right has been purchased by the Niles Tool Works, of Cincinnati, O., who are prepared to furnish the rests, or furnish tools of their own manufacture, with the patent rest attached.

Fig. 1




THE BURDGE PATENT IMPROVED TOOL REST.

### Improved Spectroscope.

Professor Osborn, of Lafayette College, Easton, Pa., has made improvements in the spectroscope, by which it may be readily applied to a variety of practical purposes, especially in metallurgical operations. In a recent letter to us he says:

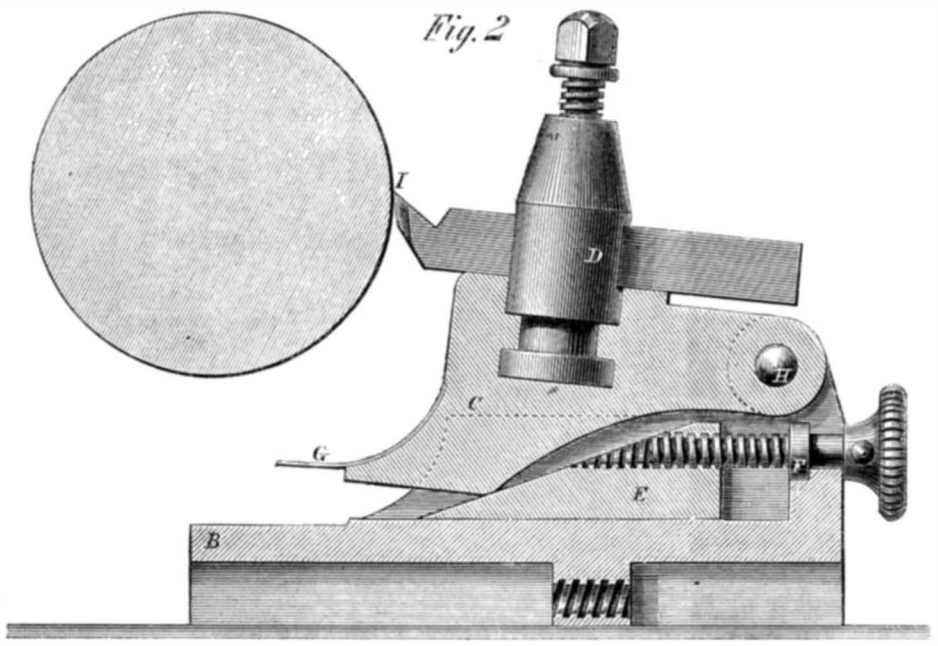
"The instrument complete is so arranged that the observer reads the degree on the scale by the actual light which he is analyzing. The very light which comprises, in its flame, the vaporized metal as lime, iron, chromium, titanium, sodium, etc., discloses to the observer in the spectral form its own nature, not only, but often to a great degree, the approximate quantities found in the original ore or even in the coal used, or from the wasting brick of the furnace. Nothing can exceed the beauty of the spectral forms which suddenly appear and disappear in the otherwise darkened tube, as the observer stands at the 'tunnel head' of the furnace, watching as it were, the spectral secrets of that terrible flame which pours forth from the stack, especially when, after the 'cast' and consequent cessation of the blast, that blast is again turned on.

"The bright yellow bar of sodium is almost always present during examination of all flames resulting from the use of any and all forms of anthracite in the furnace and forge, or from decomposing soda feldspars.

"But one of the most striking facts in my examinations occurred at our last analysis of a flame from a reheating furnace on the Lehigh, at the wire works of Stuart & Co. The workmen held partly out a bar of intensely heated iron on the hearth of the furnace, when, at rapid intervals, the dark lines which are seen in the solar spectrum appeared faintly, but certainly, flitting over the spectrum of the fierce flame by which the intensely heated iron was enveloped.

"An instrument, of a circular form, is in course of construction, under my direction, for the easy examination of these flames, and which may be used at any time and at considerable distances, and I am hoping that such shall be its sensitiveness that the furnace master may sit in his room and know much of the efficiency and value of the operations proceeding at the furnace, by its use. I am situated on a hill, and by means of my instrument, placed upon my dinner table, I can get a beautiful spectrum from a reheating furnace situated not much less than a half mile from my instrument, and am able to detect the sodium in the coal, or from the decomposed fire brick, and also any lime, potash, etc., which proceeds from the furnace mouth. I have no doubt that some exceedingly important uses may be made of this discovery of the spectroscope in the line of metallurgical operations."

Fig. 2




### On the Pressure of Steam at High Temperatures.

Prof. Klingenfeld has lately succeeded in finding a formula for the calculation of the expansive energy of heated water: as the same is quite simple and short, and the differences between the results obtained by it and the best known experiments are quite insignificant, we hope its publication will will not be out of place. It is the following:

$$t = 180 \log. (4 + 6a) + 32.$$

$t$ expresses the temperature, $a$ the number of atmospheres, and log. Brigg's logarithms.

In the following table we have placed the calculation by this formula side by side with the results of M. Regnault's experiments, quoted from the excellent Principles of Physics of Prof. Benjamin Silliman.

| PRESSURE. Atmospheres. | TEMPERATURE FAH. OBSERVED. Degrees. | TEMPERATURE. FAH. CALCULATED. Degrees. | DIFFERENCE. Degrees. |
|---|---|---|---|
| 1 | 212 | 212 | ... |
| 2 | 249·5 | 248·7 | +0·8 |
| 3 | 273·3 | 273·6 | —0·3 |
| 4 | 291·2 | 292·4 | —1·2 |
| 5 | 306· | 307·5 | —1·5 |
| 6 | 318·2 | 320·3 | —2.1 |
| 7 | 329·6 | 332·1 | —2·5 |
| 8 | 339·5 | 348·8 | —1·3 |
| 9 | 348·4 | 349·3 | —0·9 |
| 10 | 356·6 | 357· | —0·4 |

*Example.*—Required, the temperature to produce a pressure of 67 pounds per square inch (the atmosphere taken at 15 lbs.)

$t = 180 \log. (\frac{154}{5}) + 32$ (log. $(4 + \frac{6 \times 67}{15})$, being equal to log. $(\frac{154}{5})$.

$$\log. \frac{154}{5} = 1{\cdot}4885.$$

$t = (180 \times 1{\cdot}4885) + 32 = 299{\cdot}93°$, the temperature required.

### The National, Anti-Monopoly, Cheap Freight Railway League.

This is the somewhat pretentious title of an association the object of which is to construct railroads for the use and benefit of the public, with a view to the ultimate adoption of the system on all roads. The idea is, that our railroads, as at present conducted, are doing but a tithe of the work they are calculated for; that the cheap transportation of freight from point of production to point of consumption is a desideratum to all classes; that the proper development of our immense agricultural, mineral, and manufacturing resources demands cheap and rapid means of intercommunication, and that open competition and equal advantages are better than close monopolies.

The intention of the association is to construct several new lines of railroads connecting the South and West with the East, making, in the aggregate, about 4,000 miles of road, exclusive of branches. On these roads trains for freight are to be run—by any individuals or companies who may wish to avail themselves of the privilege by paying a certain toll—at a certain rate of speed, thus keeping the road in continual use. Once established on one independent line, its advantages and benefits would probably insure its adoption on every road in the country.

We have repeatedly referred to this project in favorable terms, but we deem it of too great importance to be allowed to rest. The whole country is interested in this matter. Not unfrequently the cost of transporting articles of prime necessity from their locality of production to the place of consumption is greater than the first value. Every means that can cheapen the price of food, fuel, etc., is eminently worthy attention, and no means is more direct than the diminution in the cost of transportation.

We agree with the *American Railroad Journal*, which says:—

"Few persons, at sight, comprehend the immense effect of an improved system for the rapid and cheap handling of the agri-agricultural, mining, and manufacturing resources of the country. It was stated by an intelligent farmer of the West, a few days since, that the 'Cheap Freight Railway System,' if accomplished, would add three-fourths to the average net profits of agriculture, after deducting the cost of production, to the whole country west of Utica. It has been clearly pointed out that Pennsylvania, in consequence of expensive freights, is suffering under a yearly deficiency of production of more than one hundred millions as compared with some other States, and that Ohio and the West generally, stand in nearly the same category, while the Southern States exhibit a still more meager production. It was well remarked by an experienced railway financier of England, lately, in this country, that 'the great West is strangled by illiberal railway policy, while the South is starved,' and he concludes that 'cheap freights and very numerous trains are the remedy.'"

As to the feasibility of the plan we have no doubts; the great difficulty will be in convincing railroad corporations and their stockholders that equal rights without monopoly will be in the end more profitable than the present system. Their prejudices, however, would rapidly disappear with the first successful development of the new plan.

Feat of a File Maker.—A workman in one of the Sheffield Works has cut a file 19 inches long, 8 inches wide, and 1 inch thick. The file is rough on one side and bastard-cut on the other. The chisel used in cutting it was 12 inches in length so that instead of being over-cut and up-cut in rows one row sufficed for both cuts.

M. Paul Morin, the chemist in charge of the Aluminum Bronze Works near Paris, asserts that the melted alloy when poured into the mold is transparent. Mr. T. Sterry Hunt hearing of the assertion witnessed the operation and states that the appearance of the molten stream seemed to corroborate the statement.

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NEW YORK, SATURDAY, DECEMBER 21, 1867.


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## CLOSING OF THE VOLUME---INDEX AND TITLE PAGE.

We had at one time the impression that only a portion of our readers desired the index and frontispiece which are published at the close of each volume of the SCIENTIFIC AMERICAN. Acting on this idea, at the close of Vol. XVI., we notified our readers that the index and title page would be sent only when applied for. The applications were so numerous and general that we have concluded to print as a part of the next or closing number of Vol. XVII., the full index and title page. We were gratiffed to learn by the immense number of applications for the index after the close of last volume, that so large a proportion of our subscribers preserved their numbers for binding.

## THE "SCIENTIFIC AMERICAN."---COMMENCEMENT OF A NEW VOLUME.

With the issue of the next number, Volume XVII. of the SCIENTIFIC AMERICAN—New Series—will close. One year ago we enlarged the paper—nearly doubling its size—at a heavy expense, but without raising the price of subscription, confident that our endeavors to improve and beautify the paper, and benefit our readers, would be appreciated by them and result in a corresponding increase of the number of our subscribers. We were not mistaken, and the SCIENTIFIC AMERICAN continues to be, as for nearly a quarter of a century it has been, the best and most highly valued journal devoted to Science and Mechanics in the country. Its editorials are widely copied, both here and abroad; its published correspondence brings practical men, throughout the country and world, *en rapport* with each other; its illustrations and descriptions of new inventions make the mechanic acquainted with the improvements of others, and serve as valuable guides to the inventor; its replies to correspondents contains weekly a vast fund of valuable information on almost every practical subject, and its department for the young conveys knowledge which is of present interest, and may be of future benefit. In addtition to these departments, our Editorial Summary gives notices of mechanical novelties and recent scientific discoveries, culled with great care from various sources, not only from our domestic and English exchanges, but translated from French and German periodicals expressly for our columns. Our Mining, Manufacturing and Railway Items present from week to week a brief but comprehensive *resumé* of the events and discoveries in these departments. The list of foreign patents taken out by Americans, which is prepared for our columns weekly, and the complete official list of United States patents are of great value to the inventor, manufacturer and mechanic.

What the SCIENTIFIC AMERICAN has been the past year it will be hereafter, except that no efforts will be spared to improve in every department as opportunity offers and the progress of the times demands. Our aim is to encourage honest and persistent endeavor, to give counsel and advice where needed, to state our sincere opinion when requested, to defend the mechanic from unprincipled charlatans by exposing the fallacy of their pretensions, and to contribute, as much as lies in our power, to the assistance of inventors. The opinions of correspondents are respectfully considered, and their productions published when they possess such merit as makes them valuable to others. We shall not hesitate to expose the humbugs of pretenders, while we shall be no less earnest in the encouragement of honest seekers after truth.

## IMPROVEMENTS IN STEAM ENGINES SINCE THE TIME OF WATT.

So long as steam remains a mechanical power adapted to the uses of man, so long will the fame of James Watt endure as the grand improver of the mechanism through which that agent works. Still, it may be doubted whether the practice of ascribing all the benefits of the steam engine, as at present used, to the genius of Watt, and thus robbing later inventors of the credit due them, is borne out by the facts. The steam engine of the present day is a much greater advance on the best, constructed under Watt's supervision and from his plans, than his was on the crude attempts of Savary. Within the memory of living mechanics, the steam engine has undergone such a complete transformation, not only in outward form, but internal construction, as to be an almost entirely different machine. A stationary engine of thirty years ago would be a curiosity to our young engineers. The length of stroke as compared with diameter of the cylinder was enormous; the fly wheel was only a fly wheel, never a pulley; the valves were unbalanced; few engines "cut off" or used steam expansively, and the governor merely checked the inlet of steam to the chest, but did not govern the valves. All these important points have been the subject of comparatively recent improvements.

On the best engines now built the steam is used expansively, in one cylinder, by means of cut-off valves, and the action of the valves is governed directly and absolutely by the regulator or governor; so that the amount of steam admitted to act upon the cylinder piston is adjusted exactly or nearly so, to the work required of the engine—a most important, if not a radical, improvement. The immense pressure sustained by the old-fashioned valves, which had to be moved by purely mechanical force under a load denoted by the pressure of steam per square inch multiplied by the area of the valve, and against the immense friction of the surfaces of the valve face and seat, is now almost wholly annihilated by improvements in this part of the machine. The improved packings for piston and stuffing boxes, while diminishing friction in these parts, have added immensely to their efficiency, and in connection with the use of live steam cylinder jackets, have insured a great saving of steam, and, consequently, fuel. The condenser for low-pressure engines has been as much improved by comparatively modern inventions as any other part.

It is evident that Watt had an idea of these possibilities. For instance, he conceived the project of using steam expansively in one cylinder, but it was left to later inventors to perfect it. It would be unjust to those mechanics who have for the past twenty-five years made steam and the steam engine their study, to deprive them of the credit due them for increasing the efficiency of this great mechanical motor. James Watt was a great inventor, but he did not exhaust the possibilities of the steam engine by his inventions.

## PETROLEUM FOR STEAMSHIP BOILERS---THE RPEORT OF THE NAVY DEPARTMENT.

We have frequently alluded to the project of substituting petroleum for coal as a fuel for generating steam, and on pages 137 and 153, current volume, we considered the matter in two articles in which we treated on the comparative heating powers of petroleum and coal; their relative values as heat producers; relative cost; relative space occupied on board ship, and the dangers, real or supposed, of storing petroleum on board vessels. In subsequent articles we also considered the life of the petroleum apparatus as compared with the coal furnace, and the difference in the cost of labor. From these facts, fortified by figures which were eminently reliable, but which were as favorable as possible to petroleum, we deduced the conclusion that this substance could not safely and economically usurp the place of coal. This conclusion is fully sustained by the report of the Secretary of the Navy who says:

The act approved April 17, 1866, appropriated five thousand dollars for testing the use of petroleum as a fuel for marine boilers. An elaborate series of experiments has been made at the New York and Boston Navy Yards. The conclusion arrived at is that convenience, comfort, health, and safety are against the use of petroleum in steam vessels, and that the only advantage thus far shown is a not very important reduction in bulk and weight of fuel carried.

It would seem that this declaration is sufficiently explicit to satisfy the most sanguine advocates of petroleum as a substitute for coal. We have had no personal nor pecuniary interest in this question, our only desire being to present the plain facts without wishing to do an injury to any experimenters. It may be that some cheaper material than coal, less bulky, and more easily managed, may in the future be discovered, but we have yet to see the proofs that petroleum is the substance destined to supersede coal.

## PATENTS.

The rapid increase during late years in the number of patents annually granted for new inventions, is something astonishing. Statistics in an old Patent Office Report at hand show that, during the first fifty years after the establishment of the Office, the number of patents issued for that entire period fell far below every annual issue for some years past, and a comparison of the list of claims published in the earlier numbers of the SCIENTIFIC AMERICAN, with the lengthy record which, week after week, now appear in our columns, is proof conclusive of the growth of business in this department.

The report of Secretary Browning for the year ending October 1st shows that 2,500 more applications were made this year than last, and over 5,000 more than on any previous year. The whole number of applications was 16,547. Of these, 12,879 were allowed, and 11,655 have been issued—an increase of about 3,000 over last year's issue. During the same time, 3,486 caveats were filed, 96 applications for extensions were received, and 82 extensions were granted

The Patent Office receipts for the year were $611,910.61, the expenditures $553,599.98, leaving a balance of 53,310.63, which, added to the balance on hand, makes the amount now in the treasury to the credit of the Patent Fund, $286,607.89.

## WOOD ENGRAVINGS---HOW THEY ARE MADE.

The art of engraving is one of the oldest, and its origin is lost in the mists of antiquity. Probably it was cotemporaneous with the origin of written language, and may have preceded it in point of time. A variety of substances are employed to receive the work of the engraver, but wood is now more extensively used than any other; and wood engraving has been brought to such perfection as to rival in delicacy of finish and richness of effect the best efforts of engravers on metals. Wood engraving is used entirely for the illustrations in periodicals and mainly for those in books, although occasionally specimens of steel plate engraving are inserted in very elegant and costly volumes. The woods employed are box, pear, apple, beach, maple, mahogany, and pine, of which box is infinitely the best. The large illuminated posters used by exhibitions are coarse engravings on pine or some other common wood, cut with the grain. Of course, no attempt at finish or elegance can be very successful with such material, yet the effect, when combined with judgment in the printing, is frequently quite imposing.

Box wood, on which the best engravings are cut, is the product of a shrubby evergreen, a dwarf variety of which is in common use here as borders to flower beds and gravel walks. The tree variety seldom passes in this country beyond the size to which the term shrub rather than tree could be properly applied, although we have seen one specimen at least fifteen feet high, the stem or trunk of which was over seven inches in diameter. In southern Europe, however, this size and even larger is quite common. The name box—Latin *buxus*—is from a Greek word which means also cup or vase, denoting its use in former times for the construction of drinking vessels. It is still largely employed for the manufacture of ornamental boxes and other specimens of the turner's art. But its principal value is its adaptability for engraving.

Large quantities are sent from Spain, the Levant, and the island of Majorca. A considerable quantity is brought also from Turkey. The wood is yellow in color, hard, heavy, very close and even grained, and susceptible of a high polish. Its specific gravity varies from 0·971 to 1·328. If the latter is taken as a standard, the specific gravity of box wood exceeds that of any other wood known to the arts, as ebony has a specific gravity of only 1·259, and guaiac of 1·302. The wood is prepared for use by steeping large blocks in water for 24 hours, after which it is boiled in water and then dried in sand or ashes.

It is brought to this country in logs or blocks, denuded of its bark, and for engraving purposes is sawed across the grain, squared, and planed to a true surface on each face. It is seldom obtained in pieces six inches square, although we have seen one specimen perfectly sound, and of excellent quality, which squared to seven-and-one-eighth inches. Most blocks, however, of such dimensions on which engravings are cut, are composed of from three to eight pieces, joined and secured in the most exact manner. The engravings prepared for the SCIENTIFIC AMERICAN are invariably cut on box wood, and not nfrequently one of the blocks contains eight or ten pieces.

The blocks when ready for the designer or artist are exactly the thickness or hight of the ordinary type—a shade less than fifteen-sixteenths of an inch, or, more correctly, twenty-nine thirty-seconds of an inch. The upper surface, which receives the design, is finished very smoothly, and preparatory to receiving the drawing is coated with flake white—that scraped from the faces of enameled cards being generally used. The artist transfers the outline of the design to the face of the block by means of a transparent paper on which the design is drawn. The drawing and shading is made by lead pencils of different qualities and a camel's hair pencil charged with sepia or India ink. When done by an artistic hand the drawings are very beautiful, presenting an elegance of appearance very difficult to reproduce on paper from the engraved block.

Although the engraver must follow the lines and shadings of the designer, the former, to be successful, must possess great skill, acquired only by practice, and use considerable judgment in carrying out the artist's ideas. The excellence of the engravings published in this journal testify to the talent of our principal artist, Mr. F. Louis Seitz, and our engraver, Mr. Richard Ten Eyck.

The engraving is done in the same manner and with tools similar to those employed in engraving on metals. Most of it is done entirely by hand, although sectional views and those portions which consist only of unshaded parallel lines are engraved by a simple machine called a "ruling machine."

During the progress of the work of designing and engraving, the blocks must be defended from damp atmosphere and the sun's rays. If the design is to be reproduced indefinitely it is usually considered best to make from the block one or more electrotypes, which, being of type metal coated with copper and mounted on wood, will last for years. In wood engraving the "whites" are cut away from the surface, leaving those parts which are to receive the ink and produce the impression, in relief. But occasionally the reverse course is adopted and the figures or letters are sunk into the wood and the ground is left, producing a black ground with white

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figures. This is a method employed for producing outline sketches at but little cost. When used in the pages of a book or newspaper the engraved blocks are placed in the form and locked with the type. Considerable experience is required in printing these illustrated pages. After a form, the pages of which consist wholly of type, is once secured on the bed of a press it is ready to give its impression to the paper; but where the pages contain engravings they must be "worked up" with "underlays" or "overlays" until the proper effect is produced. Underlays are films of paper pasted to the bottom of the block to raise one portion of the engraving relatively higher than the others, and "overlays" are similar devices placed on the "blanket" between which and the form the sheet to be printed is passed. Although the engraver may have exercised the utmost skill, yet the proper effect of his work is brought out by the pressman. The adjustment of the illustrated forms of the SCIENTIFIC AMERICAN sometimes requires the careful and judicious labor of the pressman four or five hours.

From the foregoing it will be seen that Xylography or Wood Engraving is an art requiring talent, skill, and excellent judgment for its successful prosecution. It has attained a high degree of perfection in this country, and until some cheaper and superior method of reproducing designs is introduced, will remain an efficient means of intellectual education and amusement.

## OFFICIAL REPORT OF.

# PATENTS AND CLAIMS

### Issued by the United States Patent Office,

FOR THE WEEK ENDING DECEMBER 3, 1867.

*Reported Officially for the Scientific American*

PATENTS ARE GRANTED FOR SEVENTEEN YEARS the following being a schedule of fees:—

| | |
|---|---|
| On filing each Caveat | $10 |
| On filing each application for a Patent, except for a design | $15 |
| On issuing each original Patent | $20 |
| On appeal to Commissioner of Patents | $20 |
| On application for Reissue | $30 |
| On application for Extension of Patent | $50 |
| On granting the Extension | $50 |
| On filing a Disclaimer | $10 |
| On filing application for Design (three and a half years) | $10 |
| On filing application for Design (seven years) | $15 |
| On filing application for Design (fourteen years) | $30 |

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

☞ *Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to Inventors, may be had gratis by addressing MUNN & CO., Publishers of the Scientific American, New York.*

71,566.—LAMP.—J. B. Alexander, Washington, D. C.

I claim the single plate, A, with the turned edegs, C and C', and the bent stop piece, D, in combination with the wick tube, B, the notches, E and E', the bevelled friction collars, G and G', the axle, F, the spring, S and S', and the burner, I, substantially as described and for the purpose set forth.

Also the notches, E and E', in the edges of the wick tube, B, substantially as described and for the purpose set forth.

Also the bevelled friction collars, G and G', in combination with the axle, F, the plate, A, the wick tube, B, the spring, S and S', the notches, E and E', and the slots, K and K', when arranged together and with regard to the adjustment of wicks in oil-burning lamps.

71,567.—DIE FOR SWAGING AND FORMING BUNTER SHAPES.—A. E. Barnard, Akron, Ohio.

I claim the herein-described swages for forging bunting irons or shapes, when the same are operated by a tilting or power hammer, in the manner substantially as set forth.

71,568.—MACHINE FOR CARVING WOOD.—August Basse, Quincy, Ill.

I claim conveying the motion from the tracer to the cutter by means of the slotted levers, Q3 and R1, and link, R, which may be adjusted to cut the figure carved the same hight of the pattern, or either higher or lower than the pattern.

Also constructing the coupling, P2, with a spring to press the cutter shaft against the traverse rod, substantially as described for the purposes set forth.

Also constructing the couplings, Q1 and S2, with clamping nuts, as described, so that when the tracer and cutter are set or adjusted the nuts may be clamped upon the screws to prevent them from turning.

71,569.—STEAM BLOWER.—John A. Bassett and Oliver C. Smith, Salem, Mass.

We claim the arrangement of the several parts herein shown and described, or their equivalents, whereby is produced a blast of commingled air and steam, the air being previously compressed by the fans, C, and injected by the steam jets, D, the whole operating together in the manner and for the purpose as herein described and set forth.

71,570.—WASHING MACHINE.—Mikel Beck, Lake View, Ill.

I claim the gear, consisting of the grooved plate, A, pin or shaft, B, provided with plate, b, and rollers, d d, in combination with the lid or cover, F, of the box, the whole arranged and operating substantially as herein set forth.

The spider, C, provided with pins, G G, in combination with the above-described gear, substantially as set forth.

71,571.—OVEN FOR COOLING WINDOW GLASS.—Desire Bievez, Haine St. Pierre, Belgium.

I claim the lifting frames, constructed, arranged and operating substantially as and for the purpose herein specified.

Also the movable longitudinal bars for moving the glass sheets or plates along, substantially as herein set forth in combination with the lifting frames.

Also the grooved oven bed for the reception of the transverse bars of the lifting frame and the longitudinal moving bars, substantially as herein specified.

71,572.—CORN PLANTER.—Orson Billings Lagrange, Ohio, assignor to himself, Russell H. Penfield and Homer Penfield.

I claim the blade, A, with its flanges, a, in combination with the blade, B, having flanges, f, and spring, D, substantially as described and set forth.

71,573.—WIRE FIGURE.—Wannibald R. Boerner, Chicago, Ill., assignor to himself and Carl R. Boerner.

I claim, 1st, A wire figure composed of the removable waist and lower part without a central support or pedestal, substantially as and for the purpose set forth.

2d, The removable waist, D, provided with the wire, A, in combination with the lower part, F, provided with the strong metallic hoops, B and E, as and for the purposes specified.

71,574.—CARRIAGE SPRING.—Priseus E. Bomboy, Espy, Pa.

I claim, in the construction of springs for carriages and other like purposes, the combination of the spiral springs, B, with the flat springs, C, one end of the latter being connected to the axle tree, the other to the shaft, substantially as and for the purpose described.

71,575.—HORSE HAY FORK.—Lester L. Bond, Chicago, Ill.

I claim the prongs, E, pivoted to the bar, B, and connected by links, K, to the bar, A, in combination with the lever, D, pivoted to the bar, A, connected by link, c, to the bar, B, when said parts are arranged for joint operation, substantially as herein described.

71,576.—RUNNER FOR WHEELED VEHICLES.—Ferdinand T. L. Boyle, New York city.

I claim, 1st, Connecting a runner to the wheel of any vehicle by means of a central clamp or fastening embracing the bottom of the wheel and perpendicular under the center of the wheel or its axle and of a front and rear brace located substantially as described extending from the runner to the wheel and inclined inward toward the axle, substantially as and for the purposes set forth.

2d, In combination with such a runner so constructed the arrangement of the flexible chain, d, and tightening screw, f, and of the movable braces, g g, and brace rod, o, either separately or in combination for binding and holding the wheel securely to the runner, for the purposes set forth.

3d, In combination with such runner the construction and arrangement of the hinged brace, g, and brace rod, j', and chain clamps, as shown in Figs. 18 and 19, substantially as and for the purposes set forth.

4th, In combination with such a runner the arrangement of the fixed clamps and braces, B B1 B2, Plate II, and the cross pieces, E, for securing the wheel and runner together.

5th, In combination with such runner the arrangement of the adjustable bed plate or bolster, D, or its equivalent, to adapt the length of the front and rear braces to wheels of different diameters, for the purposes set forth.

6th, The construction of the bed plate, K, for taking the wheel, having a surface formed of a single concave or by the intersection of two concaves as described so as to secure two or more distinct and independent points of bearing or contact for the wheels, for the purposes set forth.

7th, In combination with such a runner the use and arrangement of the races, l m m', for connecting the runner and axle to protect the runner against side thrust or strain.

8th, Forming the side braces, m m' or H' H', with a hook or shoulder at either or both ends, substantially as shown in Figs. 4 6 7, Plate II, for the purposes set forth.

71,577.—HAY RAKER OR LOADER.—William F. Brown, Washington, D. C., and J. Nottingham Smith, Jersey City, N. J.

We claim the conveying passage inclosed between the slats, L L and I I, and narrowing in the upper portion thereof in combination with the gathering rake teeth, G G, and the elevating teeth, H H, revolving with the driving wheels whether the under slats, I I, are fixed or revolve in that portion encircling the axle, substantially as and for the purpose herein specified.

71,578.—GLASS MAKER'S POT.—W. H. Capewell, Westville, N. J.

I claim inclosing the waist, a, and bottom of the pot, A, within a cup, B, when constructed and arranged as and for the purpose herein specified and described.

71,579.—HORSE RAKE.—Samuel Carpenter, Brookfield, Ill.

I claim the combination of the bars, A B, uprights, a, teeth, F, arms, C C, and connecting bars, D D, provided with a series of holes, e, all arranged and operating substantially in the manner and for the purposes specified and set forth.

71,580.—BUFFER AND DRAW BAR FOR RAILROAD CARS.—Edward L. Caum, Patterson, Pa.

I claim the combination of the yielding bumpers, D D, with the sliding rods, A A, when said rods are connected by the plates, C C, and employed in connection with the plates, F F, and bolts or draw bars, E E, and adjusted within the car frame, and arranged to operate substantially as and for the purpose set forth.

71,581.—CULTIVATOR TEETH.—Norman Chappell (assignor to Henry E. Chappell), Lima, N. Y.

I claim, 1st, The arrangement in cultivator teeth of the plate, P, and shares, w, substantially in the manner and for the purposes herein shown and described.

2d, The combination of the shares, w, and separators, s, substantially in the manner herein described and for the purposes set forth.

71,582.—COW-MILKING MACHINE.—Isaac Cook, Phi adelphia, Pa.

I claim, 1st, An air pump so combined with a milking machine that the milk will be drawn into the receiver or bucket without passing into or through the said pump.

2d, Giving a raising and lowering motion to the teat cups while milking, substantially for the purpose shown.

3d, A stop cock so combined with a cow milker and so arranged relative to the teat cups that the operation of milking may be discontinued on all the teats at one and the same time.

4th, Bevelling or thinning the upper ends of the teat cups either inside or outside, as shown and described.

71,583.—ROOF TILE.—William Cranage, Cleveland, Ohio.

I claim tiles constructed with offsets, B C, at the sides and ends forming rabbeting joints in laying said tile as specified, being a new article of manufacture.

71,584.—EYE GLASS.—James J. Crispin, Providence, R. I.

I claim the combination of a clasp, C, spring, A, and frame, B, substantially as described.

2d, Also the combination of the spring, A, spiral spring, E, and frame, B, substantially as described.

71,585.—PAINT.—Hiram Curtis, New York city, assignor to Edward P. Curtis and Stephen D. Law.

I claim, 1st, Subjecting marble dust or finely pulverized marble, when used in the composition or manufacture of paint and for similar purposes to the action of water, substantially as and for the purposes set forth.

2d, The use of marble dust when so treated or prepared in the manufacture of kalsomine or covering for walls, ceilings, etc.

71,586.—DEVICE FOR GRINDING CUTLERY.—Jonas P. Curtiss, New Britain, Conn.

I claim a device for forming and finishing the edges of knives, etc., substantially as described.

71,587.—BUILDING.—William Damerel, Brooklyn, N. Y.

I claim, 1st, The combination, in a face wall, of a lap joint, with bevelled articulations, substantially as described.

2d, In a face wall the combination with the bevelled joint at the top of flange, c, of the rounded joint on the outer side of the wall, substantially as shown.

3d, The combination with the bevelled joint on the top of flange, c, of the square outer joint shown on the upper block in Fig. 2, substantially as described.

71,588.—SCALES.—John C. Dell, Philadelphia, Pa.

I claim a graduated beam, B, connected to levers supporting a platform, L, in combination with a lever, F, which supports a "scoop," N, and which is connected to the beam, B, the whole being constructed and operating substantially as and for the purpose described.

71,589.—ROTATING-TOOTH CULTIVATOR.—Jay Densmore, Holley, N. Y., assignor to L. A. Densmore and Hiram Curtis.

I claim, 1st, A rotating cultivator tooth consisting of any number of teeth attached to a hub or common center around which they are free to revolve and set at an angle to the draft, substantially as described.

2d, The combination and arrangement with a rotating cultivator tooth of the standard, S, the pin, P, the bush, o, the washer, i, and the keys, l and n, substantially as set forth and described.

3d, The combination and arrangement with a rotating-tooth cultivator of the frame, B, the shaft, G, the cranks, F, the wheels, A A, the lever, L, the pin, 3, the cross bar, N, and the holes, 4 4 4 4 4 4, substantially as set forth and described.

4th, The combination and arrangement with a rotating-tooth cultivator of the pole, M, the guides, K and I, the pin, t, the holes, 2 2 2 2 2, the driver's seat, C, and the spring, E, substantially as set forth and described.

71,590.—CONDUCTOR'S TICKET BOOK.—Rudolph de Roode, Lexington, Ky.

I claim, 1st, A conductor's ticket book provided with two series of leaves and corresponding indexes for the places of departure and destination respectively, substantially as set forth.

2d, A passenger's ticket having a piece of money so secured within it as to be removable only by the destruction of the ticket, substantially as and for the purpose set forth.

71,591.—CAR BRAKE.—William H. Dunham and James Widney, Allegheny City, Pa.

We claim, 1st, The arrangement of the levers, C and C', pivoted to the hangers, h, and made operative theough the medium of the chains, 6, pulley, o, lever, x, and rods, 3 and 4, and made inoperative by means of the springs, 12, the whole constructed, arranged and operating in the manner herein described and for the purpose set forth.

2d, In combination with the above the rubber, B', and support, A', pivoted to the levers, C and C', the whole being constructed, arranged and operating in the manner herein described and for the purpose set forth.

71,592.—LOADING ORDNANCE.—James B. Eads, St. Louis, Mo.

I claim, 1st, The combination of a gun carriage, A C, with a shot lifter, composed of one or more steam cylinders, and a shot platform, E, the whole to be operated and employed in the manner shown and described.

2d, Also the shot platform when composed of a fixed bed piece, E, and a hinged or tipping piece, E1, for the purpose of disengaging the shot from the platform, in the manner shown and described.

71,593.—MELODEON.—Kaspar Ebermeyr, Ellwangen, Germany, assignor to Max Riederer, New York city.

I claim so combining the keys, the bellows, and reeds or pipes of a musical wind instrument that by the act of depressing the keys the appropriate bellows are put in operation and the required wind is created to produce the sound of the appropriate reeds or pipes, substantially as shown and described.

71,594.—MODE OF ATTACHING HANDLES TO CROSS-CUT SAWS.—J. E. Emerson, Trenton, N. J.

I claim the use of a wedge-shaped or wedging bolt for securing a removable and replaceable handle to a sawso that it will not only hold laterally but force the saw endwise against bearing to give it an end support, substantially as described.

71,595.—DRAFTING INSTRUMENT.—Thomas Evans, Newark, N. J.

I claim, 1st, The combination of the scale rules, b and g with the square, a, made adjustable thereon, substantially as set forth.

2d, The arm, c, in combination with the slotted straight edge, b, each being provided with a point, d 1, and made adjustable with reletion to each other, substantially as and for the purpose set forth.

71,596.—CAR REPLACER.—B. W. Felton, Roxbury, Mass.

I claim my improvement or duplex car replacer, that is, as made with the two triangular projections, A B, and channels, a a, arranged on opposite sides of the plate and with respect to one another, substantially as set forth.

71,597.—ROOFING COMPOUND.—Samuel Fields, Bridgeport, Ohio.

I claim the roofing compound consisting of the above-named ingredients, substantially as described.

71,598.—RAILROAD JACK.—Alfred D. Fox, Oil City, Pa.

I claim the combination with the lifting screw carrying the swivelling hook which grasps the rail from beneath, of the nut or box mounted on the independent legs, when the several parts are constructed and arranged for joint operation as and for the purpose described.

71,599.—DEVICE FOR SMOOTHING CLOTH.—Christopher L. Frink (assignor to E. H. Robinson, E. I. Smith and Robert L. Frair), Rockville, Conn.

I claim the movable bearing bars, o, for the roller, p, applied substantially as specified, in combination with the main cylinder, b, and heated cylinder, e, as and for the purposes set forth.

71,600.—INSTRUMENT FOR CUTTING THE TIP FROM CIGARS PREPARATORY TO SMOKING.—Conrad Froehlich, Philadelphia, Pa.

I claim, 1st, The within described instrument, consisting of a frame constructed substantially as described, one or more conical openings, f and g, knife, B, and operating lever, D, all being arranged and operating substantially as set forth.

2d, The combination of the above with the receiver, h.

71,601.—RAILROAD TIME INDICATOR.—C. C. Gale, Cleveland, Ohio.

I claim, 1st, Indicating automatically the arrival and departure of railroad trains, steamships, stages, etc., over or along the line or direction of said carriers, mapped out, showing the position of stations on the route, for the purpose substantially as set forth.

2d, The indicators, K J, provided with curved arms, M, in combination with the endless cord, G, in the manner as and for the purpose specified.

3d, The application of the mechanical movements, when so arranged, in combination with the indicator, J', and operated by the same, as to signal by bells the arrival or departure of railroad trains, in the manner substantially as set forth.

71,602.—STOVEPIPE THIMBLE.—Jos. P. Gallagher, St. Louis, Mo.

I claim the thimble plate, B, provided with registers, b, in combination with the self-acting stopper plate, B' L, when the latter is arranged so as to be operated substantially in the manner as herein shown and described.

71,603.—SASH STOP.—Joel G. Garretson and Franklin D. Clark, Buffalo, N. Y.

We claim the eccentric segments, D E, geared together, and self-operating, by means of the weighted portion, e, and lever, F, arranged and operating substantially as and for the purpose set forth.

71,604.—FEED WATER HEATERS FOR LOCOMOTIVES.—Benj. Garvin and R. J. Pettibone, Oshkosh, Wis.

We claim the combination of the pipes, E D and F F F, etc., steam chambers, B C, arranged inside of a smoke stack and over the collar, H, substantially as and for the purpose herein specified.

71,605.—APPARATUS FOR FORMING THREADS ON SHEET METAL CAPS.—William T. Gillinder (assignor to himself and Edwin Bennett), Philadelphia, Pa.

I claim the apparatus herein described for swaging screw threads on sheet metal caps, substantially as set forth.

71,606.—GRINDING MILL.—Thomas Gray (assignor to himself and Henry Lapp), Clarence, N. Y.

I claim the corrugated plate, C, attached to the sliding journal bearings, c1, and adjusted by means of the set screws, d d' and F, for the purpose and substantially as herein described.

71,607.—RAILROAD SNOW PLOW.—Samuel G. Hadley, Cape Vincent, N. Y., assignor to himself, James C. Owen and A. D. Shaw.

I claim, 1st, A snow plow, having the two spirally inclined chutes, C, the spirally inclined division, E, and sides, D, when constructed and arranged for joint operation, as herein described.

2d, The construction and arrangement of the plow proper upon a secondary frame, in such a manner that the plow may be adjusted at varying inclinations, substantially as shown and described.

71,608.—GRU ING MACHINE.—Daniel I. Hall, Dowagiac, Mich.

I claim the frame, A, the uprights, B B, the cross-piece, C, and the shaft, I, with its spool and lever handle, with the chains, F and G, arranged and used as and for the purpose set forth.

71,609.—MACHINE FOR DRESSING THE FRAMES OF SLATES.—Henry W. Harper, Berlinsville, Pa.

I claim the combination of the planing wheel, F, cutter wheel, G, finishing wheel, H, and guide plate, K, the whole being constructed and arranged for joint action on the slate frame, substantially as set forth.

71,610.—DEVICE FOR ARRANGING TYPE IN ROWS.—John M. Harper (assignor to himself and A. Corey), Philadelphia, Pa.

I claim the within described grooves for receiving the type, and the sliding blocks, y, in combination with the eccentric roller, D, and the spouts, E, or their equivalents, the whole being arranged and operating substantially as and for the purpose herein set forth.

71,611.—FOLDING STEPS.—Benj. J. Harrison and Jas. Condie, New York city.

We claim the folding steps constructed in the manner and for the purposes specified.

71,612.—MACHINE FOR MIXING AND FEEDING WHITE LEAD.—John Haslet, Jr., Alleghany City, Pa., assignor to himself, George W. Fahnestock and J. L. Schwartz.

I claim, 1st, The mixer, consisting of the tank, C, the water pipe, K, the discharge pipe, V, with its gaged cock, L; the revolving arms, G G, having the perpendicular blades, H H H H H, etc., and the shaft, E, all constructed substantially as and for the purpose set forth.

2d, Combining with the mixer the feeder, having the revolving arms, P P P, and blades, R R R, shaft, S, the stationary blades, O O O O, and the gage-cock, L', constructed and operated substantially as and for the purpose set forth.

71,613.—ELASTIC CARRIAGE CURTAIN KNOB.—William H. Hawkins, Cleveland, O.

I claim the adjustable plates, A B, and rubber springs, C, or their equivalents, as arranged in combination with the curtain, G, for the purpose and in the manner set forth.

71,914.—HEAD BLOCKS FOR SAW MILLS.—Jonathan P. Haynes, Bedford, assignor to himself and Samuel C. Forsaith, Manchester, N. H.

I claim, 1st, The arrangement of the ratchet bar, P, and finger, k, in connection with and for operating the knee, D, all constructed and operating substantially as described and specified.

2d, The arrangement of the tape measure, m, index finger, o, and spring, n mounted on the shafts, O and N, for registering the set of the log, all constructed and operating substantially as described and specified.

3d, The arrangement of the eccentric handle, d, arm, b, shaft c, and the pawls, i and k, for disconnecting the traversing gear, so that the knees, D, are free to be moved in either direction, all constructed and operating substantially as described and specified.

71,615.—AUTOMATIC CLEATS FOR SAIL BOATS.—Lysander Hill, Alexandria, Va.

I claim the combination of the pendulum, P, sliding gage, R, chains, I I, or their equivalents, levers, L L, or their equivalents, spring stops, S S, and cleats, C C, substantially as and for the purposes set forth.

71,616.—DOOR SPRING.—Louis Hillebrand (assignor to himself, C. Liebrich and D. Wolf), Philadelphia, Pa.

I claim the wire spring, H, coiled round a rod secured to the frame of the door, and terminating in the arm, i, bearing against the door, when the center of the coil is in line with the hinges, all substantially as set forth.

71,617.—GAS AND OTHER RETORTS.—James John Holden and Sealy James Best, London, Eng.

We claim the employment of a chamber at the mouth of retorts, so disposed as to establish communication between two, three, or more retorts, such chamber having a door, by opening which access is afforded to such two, three, or more retorts at the same time, substantially as described.

71,618.—STEAM SLIDE VALVE.—Brice W. Hudson, Allentown, Pa.

I claim, 1st, The valve, G, having the exhaust passages, K K', leading in reverse directions and on opposite sides of an oblique partition, I, and discharging through the projection, J, into the exhaust port, F, substantially as and for the purposes set forth.

2d, The construction of the ends, 6 and 7, of the valve, in relation to the side ports, E and E', to permit steam from the chest to flash around them and through the valve, substantially as and for the purposes set forth.

71,619.—MODE OF TREATING PETROLEUM TO REMOVE THE MORE VOLATILE PORTIONS.—Fleury Huot (assignor to himself and John Rogers), New York city.

I claim subjecting petroleum and other oils to the action of air, whilesuch oil is in a finely comminuted or atomic condition, as and for the purposes set forth.

71,620.—MODE OF CONVERTING ARTICLES OF IRON INTO STEEL.—Richard A. Jackson, La renceville, Pa.

I claim the use of the ingredients herein named, when compounded and used in the manner and in about the proportions herein described, and for the purpose set forth.

71,621.—CHALK HOLDERS FOR BILLIARD CUES.—James Jenkinson (assignor to Daniel D. Winant), Brooklyn, N. Y.

I claim, 1st, A chalk holder formed substantially as set forth, for chalking billiard cues and similar articles, when pressed against the chalk in said holder, as specified.

2d, The rod, d, and spiral, in combination with the chalk holder, for the purposes set forth.

3d, Forming the chalk holder, b, with a screw ring, c, to secure the chalk and guide the cue, as set forth.

71,622.—FAUCET ATTACHMENT.—Geo. Johnson and Wm. H. Milliken, San Francisco, Cal,

We claim the faucet, A, in combination with the supplemental pipe, B, the plates, b b, and washer, D, all connected and arranged substantially as described and for the purpose set forth.

71,623.—CULTIVATOR.—J. P. Johnson, Macon, Ill.

I claim, 1st, The attachment of the forked plow beams, F F, to pendants, b b, by means of loose joints, c c, and the employment in combination therewith of the standards, G G, and diagonal braces, G' G', steps, g g, and driver's seat, D, arranged and operating substantially as described.

2d, In combination with plow beams, F, which are attached by loose connections at their forward ends, and sustained in position by diagonal braces, G' G', and standards, G G, the employment of suspending chains and stirrups for enabling the driver to raise and lowers the plows, substantially as described.

71,624.—ELECTRIC CLOCK.—Samuel A. Kennedy, Attleboro', and S. W. Holt and Joseph Gerlach, Philadelphia, Pa.

We claim, 1st, The combination and arrangement of two or more galvanometers, with two or more polarized steel bars, combined with the pendulum, and arranged either above or below the center of motion, substantially as described and for the purpose set forth.

2d, Producing a double automatic circuit, by means of the combination of the pendulum, H, with the sliding bar, L, arranged and operating in relation to the electric wires, p and p1, which project to the surface of the projections, o, and o1, of the bridge, K, substantially as described and for the purpose specified.

3d, The combination and arrangement of the electric wires with the batteries, the galvanometers, S and S1, the sliding bar or circuit changer, L, and the bridge, K, so as to produce a double-acting circuit by means of the motions of the pendulum, substantially as described.

4th, The combination of the ratchet wheel, E, with the pendulum, H, by means of the lever, F, forked bar, G, and pawl, I, arranged and operating in relation to each other, substantially as described, and for the purpose specified.

5th, The combination of the ratchet wheel shaft, c, with the shaft, a, by means of the wheels, C and D, and pinions, v and v1, substantially as represented.

6th, The combination of the set screw, j, with the forked bar, G, and pawl, I, substantially as and for the purpose set forth.

71,625.—SAW.—John L. Krauser, Tylersburg, Pa, assignor to J. E. Emerson, Trenton, N. J.

I claim, 1st, Making the tongued and grooved teeth thicker than the saw plate, as and for the purpose described.

2d, The devices, or their substantial equivalents, for holding the teeth against their inward thrust, constructed substantially as described.

3d, The tongues and grooves on and in the edges of the teeth and saw plate, when the grooves are made smaller than the tongues, by hammering, pressing, or otherwise, so that the sides of the grooves form a spring to clasp or gripe the tongue sufficiently tight to firmly hold the teeth in the saw when in motion, without the aid of any other fastening, substantially as described.

71,626.—GAME.—Geo. Krotzinger, New York city.

I claim the above described construction and arrangement of parts, constituting a new game for players, substantially as and for the purpose set forth.

71,627.—DOOR GONG.—Daniel Liebrich, Philadelphia, Pa.

I claim, 1st, The angular plate, C, hammer, D, trip lever, E, spiral spring F, and the stud, c, when combined and arranged as shown and described.

2d, The hammer, D, trip lever, E, and the pin, g, as shown and described.

3d, The hammer, D, trip lever, E, pin, g, and the spiral spring, F, as shown and described.

71,628.—DEVICE FOR HOISTING HOGS IN SLAUGHTER HOUSES.—James K. Martin, Chicago, Ill.

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I claim the concave-shaped clutch, E, as described, suspended on chains or bars, as specified, in combination with bar, A, and its appendages (roller, handle and eyelet), the whole constructed and operating substantially as herein described and specified.

71,629.—BURNING FLUID.—Thomas Martin and J. G. Evans, Muscatine, Iowa.

We claim a burning fluid composed of the ingredients and combined in the proportions herein specified.

61,630.—VENTILATING COWL.—Benj F. Miller, New York city.

I claim, 1st, The curved air passage, c, extending from the trunk, b, to the mouth of the ventilator, as and for the purposes set forth.

2d, The inclined plate, i, and plate, g, in combination with the openings, 2 and 3, for receiving and discharging water that may enter the ventilator, as set forth.

3d, The opening, 4, at the lower end of the curved plate, e, for the purposes and as set forth.

4th, The flange plates, 5, upon the plates, d, extending from the plate, f, to direct moisture out through the opening, 4, as specified.

5th, The perforated doors, h h, in combination with ventilator, formed with the curved air passage, c, and flaring mouth, as and for the purposes set forth.

71,631.—CLOCK CASE.—Deitz Monnin, Paris, France.

I claim a cast metal clock case, having its front, sides, base, top and dial cast in one piece, as set forth.

71,632.—CONSTRUCTION OF CORRUGATED SHEET METAL BOILERS.—Geo. R. Moore, Lyons, Iowa.

I claim the longitudinal braces, B B B B, or their mechanical equivalent, in the form of longitudinal bolts or bars, substantially in the manner and for the purposes herein set forth.

71,633.—CARTRIDGE BOX.—Albert Newcomb and Benj. Lyon (assignors to themselves and Samuel W. Porter), Springfield, Mass.

We claim a cartridge box, having an elastic bed or support in the bottom of the chamber, b, upon which the cartridge may rest while in place, substantially as herein described and for the purposes specified.

71,634.—SPRING BED BOTTOM.—Bartolomeus J. Oleff, Milwaukee, Wis.

I claim a bed bottom made crowning, with slats, C and D, springs B, and hooks, E, in combination, substantially as and for the purpose described.

Also, hook, E, with its nut, G, in combination with the spring, B, and slat, C, connected thereto for the purpose of tightening the slat and spring, as described.

Also, the arrangement of the inside longitudinal slats, C, in pairs, connected to springs, B, with the two outside slats single, with their connections, as described.

71,635.—PAPER CLIP.—John H. Parsons, Quincy, Mich.

I claim, 1st, The plate, C, provided with the slots, d d, constructed as described, in combination with the clip, A, having the holes, h h, all arranged substantially as described, and for the purposes set forth.

2d, The combination of the clasps, T or H, plate, C, clip, A, and guides, y y, substantially as shown and described.

71,636.—FASTENING FOR GATES AND BARN DOORS.—Ezekiel Pea, Mechanicsburg, Ill.

I claim this combination of latch, B, spring, C, and lever, A, applied to gate and door fastenings, as described.

71,637.—BURGLAR ALARM AND LOCK APPARATUS.—Charles E. Pierce, New York city.

I claim, 1st, The combination of the bolts shown in figs. 5 and 6, with the parts 5a, 5b and 6a, operating to lock a window, in the manner shown.

2d, The parts represented on figs. 14, 14a, 14b and 14c, or their equivalent, operating as described and for the purposes set forth.

3d, In combination with the elements of the preceding claim, I claim the lever, O, operating as described.

4th, In combination with the alarm mechanism, I claim the levers for increasing the length of movement, and the rollers, all combined as and for the purposes set forth.

5th, The center wheel, M, on figs. 1 and 2, made up of parts, M1 and M2, for purposes set forth.

6th, The bolt on fig. 7, made up of parts, C', I, b', and K, for locking a door or gate, at the same time that it operates the alarm mechanism, as described and for purposes set forth.

7th, In combination with elements of the claim preceding, I claim the plates, J and H, as and for the purposes set forth

8th, In combination with the parts claimed in the second and third claims, I claim the dial plate with openings, as and for the purposes set forth.

71,638.—MECHANISM FOR FEEDING SCREW BLANKS.—Elijah S. Pierce, Hartford, Conn.

I claim, 1st, The combination of the cams, M and N, the levers, B C D and G, the rocking shafts, E and R, the connecting rod, F, the spindle, H, the conveying arm, J, the rod, P, the arm, Q, the rocking piece, L, the feeding trough, O, or their mechanical equivalents, the whole constituting a feeding and conveying mechanism, substantially as herein set forth.

2d, The combination of the conveying arm, J, the rod, P, the arm, Q, and the feeding trough, O, operating substantially as herein described and for the purpose specified.

3d, The conveying arm, J, the rod, P, and the arm, Q, constructed and operating substantially as described.

71,639.—ADJUSTABLE TUMBLERS FOR PERMUTATION LOCKS.—Oliver E. Pillard (assignor to Frederic H. North), New Britain, Conn.

I claim the friction strap, i, applied around the periphery of the stud disk, b, and within the notched tumbler, d, in combination with mechanism for tightening said strap, substantially as and for the purposes set forth.

71,640.—ADJUSTABLE TUMBLERS FOR PERMUTATION LOCKS.—James H. Porter, New York city, assignor to Frederic H. North, New Britain, Conn.

I claim the circular tumbler, d e, formed of two parts hinged together, in combination with the disk, b, and with mechanism substantially as specified, for drawing the parts of the tumbler together and clamping said disk, as set forth.

71,641.—BUTTON.—H. Prouhet, St. Louis, Mo.

I claim the disk, A', and the locking plate, a2, when combined and arranged substantially as described and set forth.

71,642.—SNOW PLOW.—Samuel Richards, Philadelphia, Pa.

I claim, 1st, Combining with an ordinary eight-wheel flat car or car bottom, the removable front plane, F, and the removable inclined top piece, F',

2d, Combining with an ordinary eight-wheel flat car or car bottom, the removable front plane, F, the removable inclined top plane, F', and the upper wedge block, G, or their equivalents.

3d, The arrangement of an axle or windlass, I, endless cord, and shifting wedge piece, G, or their equivalents,

71,643.—SALT BOTTLE OR CASTER.—George B. Richardson, Boston, Mass., assignor to Thos. T. Sanborn and Wm. M. Cobb.

I claim the movable pulverizer, B, provided with points or projections, in combination with a receptacle, A, constructed and operating substantially in the manner and for the purpose set forth.

Also, in combination with the above, the piece, e, of cork, or its equivalent, placed at the bottom of the bottle, A, for the purpose described.

71,644.—JAWS FOR STEEL TRAP.—William Richter (assignor to S. D. Newbro), Lansing, Mich.

I claim the employment of the clutches, of the particular form and shape specified, constructed and attached to or near the external edges of the jaws of steel traps, substantially as above described and for the purpose set forth.

71,645.—CHURN.—F. W. Robbins, Salem, Ohio.

I claim a churn dasher when constructed with a spiral beater, p, continuous or in sections, in the manner substantially as set forth.

71,646.—LASTING SHOES.—Christopher Robinson and Wm. H. Lovejoy, Lynn, Mass.

We claim the improved mode of connecting the upper to the insole, viz., by the two ranges of sewing, one of which is carried through the other and the upper, and the other through the insole alone, as set forth.

71,647.—MACHINE FOR STRETCHING CLOTH.—Henry P. Roche, Utica, N. Y.

I claim, 1st, The combination of the roller, F4, with the supporting sockets, F5 and F3, and eccentric sleeve for disconnecting the socket from its driving mechanism, as and for the purposes described.

2d, In combination with the above, the spreading roller, H, constructed and operating as and for the purpose set forth.

3d, The combination of roller, F4, sockets, F3 and F5, and roller, H, constructed as described, with friction bars, B B, substantially as and for the purposes set forth.

4th, In combination with the above the bath, A, as and for the purposes set forth.

71,648.—SAFETY TRAP FOR BRIDLE.—Henry H. Rockwell (assignor to himself, Henry L. Bacon, and John H. Latham), New London, Conn.

I claim the arrangement and combination of the disks with the strap or straps and the rein rings thereof, the said disks being for the purpose and to operate as specified.

71,649.—HARVESTER RAKE.—John L. Rohrer, Upper Leacock Township, Pa.

I claim the combination and arrangement of the reel arms, J, with the spider, G G G, and pinion, F, in combination with the pinion, E, operating obliquely, both on the same shaft, and operated with the raking attachment, in the manner and for the purpose specified.

Also the arrangement of the clutch, B, in its flange, pivot, b, on the cap, A, operated by a spring rod, N, to connect and disconnect the cap with the driving wheel, O, which actuate the rake and reel, in the manner and for the purpose set forth.

Also the bent or shouldered plates, Q, provided with a straight and a curved slot, when employed for connecting and adjusting the rake arm, I, or reel arms, J, with the arms, G and H, in the manner and for the purpose specified.

71,650.—WASHING MACHINE.—W. C. T. Runnells, Searsport, Me.

I claim the combination of the corrugated and hinged bottom, g, with the rollers, j, table, e, weight boxes, f, shaft, d, crank, b, cord, k, and tub, a, substantially as and for the purpose specified.

71,651.—LAMP CHIMNEY.—E. O. Schartau, Philadelphia, Pa.

I claim the glass chimney with the flared top, whether scalloped or plain on the edge, as herein described.

Also the glass chimney having a shoulder formed at the top, for the purpose of permanently attaching a glass or metallic toy, as herein described and for the purposes set forth.

71,652.—CHURN.—Arba M. Seymour, Jr., Madison Wis.

I claim the construction, arrangement, and operation of the dashers, as and for the purpose specified.

71,653.—HARNESS PAD BLOCK.—Palmer Shaw, Syracuse, N.Y.

I claim, 1st, A harness pad block when so constructed that the portion in which the nails are driven is made separate and detachable from the main portion of the block, substantially as and for the purpose set forth.

2d, The hollow iron block, A, filling, B, and set screws, c c, constructed and combined substantially as herein shown and for the purpose described.

71,654.—BED BOTTOM.—Charles E. Simmons and Homer Cook, Waukegan, Ill,

We claim the combination of braces, D D D' D' and F F, hinged to the under frame, B, and to the plates, f f, with the pivoting plates, C C, arranged and operating as described.

71,655.—TWINE HOLDER.—R. L. Smith, Wolcottville, Conn.

I claim the loop or ring with the upper part of the twine holder, for the purposes and as specified.

71,656.—WASHING MACHINE.—Thomas Smith, N. Y. city.

I claim the circular flexible and spinning washboard, in combination with a series of rotating or vibrating extensible arms and clamps, or their equivalents, carrying the fabrics to be washed, all operating substantially in the manner and to the effects described.

71,657.—APPARATUS FOR GENERATING OXYGEN GAS.—Benj. R. Smithson, New York city, assignor to himself and Samuel West, Boston, Mass.

I claim the within described apparatus for generating oxygen gas, constructed and operating substantially as set forth.

71,658.—SHOEMAKER'S LAMP.—John M. Sporer, Philadelphia, Pa.

I claim the combination and arrangement of the cylinder, B, trough, D, curved arms, E E', and the steady rests, b b', as shown and described.

71,659.—GRATE FOR STOVES AND OTHER HEATERS.—Samuel B. Stewart, Brush Valley, Pa.

I claim, 1st, A gate swinging horizontally and communicating successively with two or more separate flues, substantially in the manner described, for the purpose of warming different rooms in succession by a single fire.

2d, A revolving grate divided into compartments, each communicating with an independent flue, substantially in the manner described.

3d, The combination, substantially in the manner described, of a revolving grate, divided into compartments by vertical radial partitions, and revolving on a vertical axis, with a flue having corresponding partitions, for the purposes set forth.

4th, The combination, substantially in the manner described, of a revolving grate, with a heating or cooking stove, and one or more open grates, for the purpose of applying the heat successively to each, or simultaneously to all, as set forth.

5th, the combination, substantially in the manner described, with a revolving grate having radial partitions or wings attached to and revolving with it, in the ash pit of a discharge spout, for carrying off the ashes swept into it by the wings in their revolution.

71,660.—GRAIN BINDER.—Ole O, Storle, Norway, Wis., assignor to himself and Isaac N. Mason, Milwaukee, Wis.

I claim, 1st, Rake, B, endless chain, C, spur wheels, D and D', connecting rod, E, loose wheel, F, socket, G, and sliding way, H, in combination substantially as described.

2d, Compresser, c, binding cord, l, crank, d, and wheel, S, in combination, when operated substantially as and for the purpose described.

3d, Wabbling wheel, U, pulleys, V, and nippers, X, in combination, operating substantially as and for the purpose described.

4th, Clutch, M, spring, P, lever, Q, and wheel, S, in combination substantially as described.

5th, Clutch, M, pinion, R, wheel, S, wheel, T, and cylinder, W, operating in combination, substantially as described.

6th, Slotted wheel, Y, in combination with compresser, c, and nippers, X, substantially as and for the purpose described.

7th, Slotted wheel, Y, knife, Z, and spring, a, in combination substantially as described.

71,661.—HORSE HAY FORK.—H. C. Stouffer, John Heaton and Alpheus A. Bushing, Columbiana, Ohio.

We claim the curved lever, E, check rod, F, and spring, H, as arranged, in combination with the link, D, and feet, C, in the manner as and for the purpose described.

71,662.—HAT IRONING MACHINE.—George W. Stout and John C. Richardson, Newark, N. J., assignors to themselves, James Davis, Jr., and Samuel R. Hawley.

We claim, 1st, A pair of irons operating in conjunction to iron simultaneously both sides of the brim, substantially as described.

3d, The combination in the same machine of revolving irons for finishing the brim, and also the top and sides of the crown.

3d, Finishing irons operating simultaneously upon the top of the crown, both sides of the brim, and also upon the sides of the crown.

4th, So combining the irons which operate upon the brim only, that they may be readily separated from each other at will, as and for the purposes described.

5th, The combination of the brim irons with their connecting spring, rod, and crank, substantially as and for the purpose set forth.

6th, The combination of the brim irons with their driving mechanism, so as to admit of the shifting of the positions of the irons without arresting the motions derived from the driving mechanism, substantially as set forth.

7th, The combination of the brim irons and the top iron with their driving mechanism, so that the relative positions of the irons may be changed, for the purpose set forth.

8th The combination of a revolving hat block with revolving irons.

9th, The combination of a swinging arm which carries the side irons, with a pivoted head stock, as and for the purpose described.

10th, The combination of a swinging arm, which carries the hat block, with a swinging arm which carries a finishing iron.

71,663.—SIZING FOR BANK NOTE PAPER.—John M. Sturgeon, New York city.

I claim a sizing made from the within formula, substantially as described, and combined for the purposes set forth.

71,664.—STUFFING BOX PACKING.—Charles M. Templeton, Concord, N. H.

I claim the packing ring consisting of the outer parts, R R R, and the inner parts, r r r, the same being arranged to break joints with each other, in common with the follower, F, all operating as and for the purpose described.

71,665.—CARBURETING APPARATUS.—Wm. Thompson and J. E. Hall, Cleveland, Ohio.

We claim, 1st, The agitator, J, constructed with an annular chamber, L, wings, M and N, and tubular arms, O, in the manner and for the purpose substantially as set forth.

2d, Perforated lining, B, top, Q, spouts or sleeves, C, and cotton, D, or its equivalent, as arranged in combination with the float, E, and agitator, J, in the manner and for the purpose substantially as described.

3d, The float, E, agitator, J, constructed as described, in combination with a carbureter, in the manner and for the purpose substantially as described.

4th, The herein described apparatus provided with a float and a revolving agitator, constructed as described, whereby the carbureting fluid is agitated for the purpose of largely increasing its evaporation or elimination, substantially as and for the purpose set forth.

71,666.—REGULATING WATCHES.—Hiram Todd, Columbus, O.

I claim, 1st, The combination of the screw, E, sliding nut, B, link, C, and the regulator bar, H, as shown and described for the purpose specified.

2d, The employment of the expansion and contraction of the link, C, in combination with nut, B, and regulator bar, H, constructed to act upon the hair spring of the watch and more perfectly regulate the same, as set forth.

71,667.—COMPOSITION FOR ROOFING.—Reuben Tyler and Peter Campbell, Jr., Diana N. Y.

We claim the composition of coal or gas tar with marl and a small quantity of pulverized marble, which will harden and make a good water-proof or fire-proof roof for building purposes.

71,668.—MACHINE FOR CUTTING AND MITERING PRINTERS' RULES.—Richard Walker (assignor to himself and Joseph B. Bancroft), Milford, Mass.

I claim, 1st, The cutter, n, attached to the adjustable head, m, in combination with the cutter, d, as described.

2d, The combination of the segmental platform, l, with the cutter, n, cam lever, o, and head, m, as set forth.

3d, The combination of the cutter-holding arm, b, the connecting bar, e, the cam, h, and the spring rod, k k', substantially as and for the purpose described.

4th, The graduated bar, r, and gage, s, in combination with the platform, l, as and for the purpose described.

71,669.—SAWING MACHINE.—Peleg Werni and Reuben B. De Bare (assignors to Reuben B. De Bare), Chicago, Ill.

We claim suspending the saw upon the rod, R, passing through a slid, T, which has a vertical movement upon rods, a a, attached to the vertical frame, said slide being provided with a cord, b, passing over a pulley, c, all constructed and operating in the manner as and for the purposes specified.

71,670.—CUTTER HEAD FOR MOLDINGS.—John Whitworth (assignor to himself and W. H. Hawkins), Cleveland, Ohio.

I claim the herein described chilled cast-iron cutter, made in the manner as and for the purpose substantially set forth, as a new article of manufacture.

71,671.—PORTABLE HOSE BRIDGE.—Algernon L. Wilkinson, Huntsville, Ala., and Elias Y. Beggs, Nashville, Tenn., assignors to Algernon L. Wilkinson.

I claim the arches, B B, when constructed of single pieces of angle or channel iron, and provided with lugs, c c, to hold them to a railroad track, in combination with the cross bars, o o, constructed with a swivel link, v, and a goose neck, u, substantially as and for the purpose indicated.

71,672.—SCROLL SAW MILL.—Benj. F. Williamson, Franklin County, Ohio.

I claim the inclined and adjustable revolving platform or table, D, constructed to operate substantially as described and for the purpose set forth.

Also, in combination with the post, A, the plate or heading, I, constructed to operate substantially as and for the purpose set forth.

71,673.—CAR COUPLING.—M. K. Adams, Mountain Eagle, Pa.

I claim a car coupling consisting of the double-headed bolt, E, in combination with the draw head, A, provided with the recess, I, and hinged lid, B, having the loop, c, attached, when the whole is arranged to operate substantially as described.

71,674.—HOISTING DEVICE FOR TRUCKS.—Nathan Albertson, Plainfield, Ind.

I claim the vertical rack, E, operated by the lever, F, in combination with the spring dog, b, when attached to a truck constructed, arranged, and operating as and for the purpose described.

71,675.—GATE.—Wm. J. Alexander, Rolling Prairie, Ind.

I claim the gate, A, the braces, C and E, the chain, F, with the weight, G, and pin, I, as substantially arranged and set forth in the foregoing.

71,676.—WHEEL.—Julius M. Bailey, Indianapolis, Ind.

I claim, 1st, The socket, b, when provided with grooves upon one side, in which the tenons of the felleys fit, and with grooves upon their inner sides to receive the tenons formed upon the wedge, C, said wedge adjusted by means of the bolt, d, whose head is countersunk in the tire, A, and the nut, D, all constructed as described for the purpose specified.

2d, Having the spoke, E, stepped into the slotted bed or socket, F, in combination with the wedge, G, all substantially as set forth and described.

71,677.—EXHAUST FOR MILLSTONES.—David Baird, Bloody Run, Pa.

I claim the combination and arrangement of the box, B, having the discharge port, D, and inclosing the millstones, with the exhaust pipe, E, chamber, C, having two outlets, c c, and the fan, F, the latter arranged between the two exhast pipes, e c, and drawing the air through each of them, substantially in the manner and for the purposes indicated.

71,678.—HEAD BLOCK FOR SAW MILLS.—Thomas C. Ball (assignor to himself, Abijah S. Clark, and Sumner Chapman), Bellows Falls, Vt.

I claim, 1st, The combination of the knees, C C, tables, T, and rod, R, substantially as and for the purpose described.

2d, The combination of reversing lever, L, having the pin, l, arm, a', and weighted lever, M, with the grooved wheel, S', attached to the shaft, S, all being constructed and arranged substantially as and for the purpose specified.

71,679.—CURTAIN FIXTURES.—Ashbel P. Barlow, Claremont, N. H.

I claim, in combination with a central supporter, b, the cords, d d and a a, with their supporting eyes, for lowering the upper and raising the lower part of the curtain without rolling it, all as set forth and specified.

71,680.—MACHINE FOR MAKING TIN CANS.—Christian Barry, Philadelphia, Pa.

I claim, 1st, The mode of manufacturing cans, substantially as herein described,

2d, The roll, C, with bevelled edge, f, and roll, B, with flange edge, g, operating together, substantially as described for the purpose specified.

3d, The swage or die, J, having bevel periphery, q, and swage or die, K, with its periphery, r s, bevelled and shouldered, operating together substantially as described for the purpose specified.

71,681.—MACHINE FOR STAINING PAPER.—Chas. Bartholomew, New York city.

I claim, 1st, In machines for staining or coloring wall or other paper, the application and use of the supplementary table, J, or equivalent device, between the paper and travelling apron, at the point or points where the coloring matters are applied, substantially as and for the purpose described.

2d, The division of the color box into front and rear compartments by a a partition, F, so that one set or series of colors shall be discharged in advance of another set or series, substantially as described.

3d, The arrangement of the several discharge openings of the color box in such a manner that those of the front compartments shall be opposite the solid interspaces of the rear compartments, substantially as described.

4th, Two or more openings in the same straight line in the bottom of a color box, or the bottom of a compartment of a color box, in combination with solid interspaces between such openings, for the purpose of producing stripes of color from the same compartment or receptacle, substantially as shown.

5th, The combination with a cistern, L, for the supply of color, of a strainer, M, constructed and arranged substantially as described.

6th, The arrangement, in the supply cistern, of a settling well, N, substantially as set forth and described.

71,682.—CRANE.—A. S. Batten, Topsham, Vt.

I claim, 1st, The crane, consisting of the arm, B, pivoted as described, to the double or slotted cross piece, C, and working therein and in the double or slotted brace, F, substantially as above set forth and described.

2d, The said crane, in combination with the windlass and rope or cable, substantially as described.

3d, The sleeve, N, carrying the hooks, M, in combination with arm, B, substantially as above set forth and described.

71,683.—MACHINE FOR BORING BOBBINS.—Vertot D. Beach, Battle Creek, Mich.

I claim, 1st, The use of the oil cup, C, with the brush, as described, for the purpose of oiling the reciprocating boring bits.

2d, The revolving bit holder, D, constructed and arranged to operate substantially as and for the purpose specified.

3d, The arrangement of the dog, H, the semi-elliptic springs, L L, the levers, R R, the rods, M N, the hooks, w and 6, the leaf springs, 7, the bar, v, and the stop, s, the links, I I, the nuts, 9, and the spiral spring, P, arranged and operating substantially as and for the purposes specified.

71,684.—MODE OF PACKING SMOKING TOBACCO.—F. W. Beck and E. W. Siebert, Baltimore, Md.

We claim, as a new article of manufacture, a package of cut smoking tobacco, the envelope of which is a cloth bag, constructed, as described, so that it can be opened and closed at pleasure, in the manner and for the purpose specified.

71,685.—TRUCK.—Wm. P. F. Beggs, Philadelphia, Pa.

I claim, 1st, Connecting the front end of a truck platform, A, with the platform, H, of the front running gear, by means of two or more crane-neck bars, I I, substantially as herein shown and described.

2d, The front axle, D, fifth-wheel, F, kingbolt, G, and front platform, H, in combination with the crane-neck bars, I, main truck-platform, A, and rear axle, B, all made and operating substantially as herein shown and described.

3d, The crane-neck bars, I, when arranged as described, to connect the main truck platform, A, with the platform, H, of the front running gear, and when provided with flanges a and b, by means of which it can be firmly secured to the respective platforms, as set forth.

71,686.—INK WELL.—Thomas Bell, New York city.

I claim the arrangement of a projection or ridge either on the under surface of a sliding ink well cover or on that part of the ink well table or desk over which the cover passes when being opened, substantially as and for the purpose described.

71,687.—CASTING METAL PIPE.—Benjamin S. Benson, Baltimore, Md.

I claim the anchor or stay, above described, consisting of the wire hoop, a, the doubled plates, e e, and the bolts, i i, when the parts are constructed and arranged substantially in the manner shown, and for the purposes specified.

71,688.—INSULATING COVERING FOR TELEGRAPH AND CIRCUIT WIRES.—Samuel C. Bishop (assignor to Bishop Gutta-Percha Co.), New York city.

I claim insulating telegraph and electric wires or conductors by means of valata or balata, substantially as specified.

71,689.—FERTILIZER.—Joseph W. Bitner, Downsville, Md.

I claim, 1st, The above described process of damp-rotting manure, and then pulverizing the same, substantially in the manner and for the purposes set forth.

2d, Also, the new fertilizer, prepared by rotting, drying, and then pulverizing manure, substantially as described.

71,690.—MODE OF PREVENTING HEATING MILL BURRS.—Mentor Bradley, Peru, Ind.

I claim the narrow hoop, A A, and canvas or other similar light material, adjustable to any desired hight around the burrs.

71,691.—SCREEN-GUARD ATTACHMENT.—G. Brain, Springfield, Ohio.

I claim the screen, A, in combination with the adjustable hinged plate, B, applied to a cultivator plow, to operate in the manner substantially as and for the purpose set forth.

71,692.—PESSARY.—Emeline T. Brigham, of Philadelphia, Pa.

I claim the pessary, A, conical spiral spring, B, with wire, C, having ring, D, constructed and arranged to operate as and for the purpose specified.

71,693.—ANIMAL TRAP.—Geo. W. Brown, Sacramento, Cal.

I claim the arrangement of the tipping plates, as described, and for the purpose set forth.

71,694.—GATE FASTENING.—Jas. Bull, Galesburg, Ill.

I claim, 1st, The catch, D, constructed in the manner herein represented, being bevelled off to an edge at each end, provided with a dovetailed groove at the center of its upper side, and balanced so as to vibrate upon its pivot, substantially as and for the purpose specified.

2d, The stop or latch, S, so formed as to act in connection with the catch, D when constructed in the manner and for the purpose specified.

71,695.—DEVICE FOR OPERATING PUMP ON RAILROAD STATIONS.—Hiram H. Call, Roberstown, Pa.

I claim the rockers, R, combined by a horizontal shaft, H S, actuating a vertical rocking shaft, S, arranged and operated substantially in the manner and for the purpose specified.

In combination with the rocker, R S, I also claim the two pawls, W, for clutching alternately the two twin spur wheels, A A, arranged substantially in the manner for operating pumps at railroad stations, as described.

71,696.—EGG BEATER.—Geo. G. Carver, Roxbury, Mass.

I claim the combination of the two handles with the glass tube and the head of stoppers and the stirrers, arranged within such tube, substantially as herein before specified.

Also, The combination of each stirrer as composed of the annulus, the series of parallel cross bars, and the rod extended therefrom, with the movable head or stopper to fit into the glass tube, as specified.

71,697.—PORTABLE FENCE.—Ziba Castaline, Baconsburg, O.

I claim the herein described fence, when constructed and arranged in the manner substantially as set forth.

71,698.—FIREPLACE.—A. E. Chamberlain and J. B. Crowley (assignors to Chamberlain & Co.), Cincinnati, Ohio.

I claim, 1st, An open-front stove or fireplace, arranged substantially as herein described, to take the air to support combustion from above and downward through the fuel.

2d, In an open stove or fireplace, constructed as above specified, we further claim the extended grate, J, substantially as and for the purposes set forth.

3d, In an open stove or fireplace, constituted as above specified in the first clause, we claim the interior plates, C C', for the purpose of forming the descending flues, F F', substantially as herein explained.

4th, In combination with the elements of the first clause, we further claim the flue strips, K k k', as and for the object stated.

71,699.—HITCHING STRAP.—Thomas P. Chambers, Newtown, Pa.

I claim a self checking hitching device, consisting of the chain or strap, D, fastened by means of snap hooks or otherwise to the ends of the bridle bit and combined with the hitching strap, substantially in the manner and for the purpose herein shown and described.

71,700.—BED BOTTOM.—D. G. Chapin, Galena, Ill.

I claim fastening the coiled springs of beds to the slats by means of a broad-headed nail passed through the apex of said spring, as herein shown and described.

71,701.—ELECTRO AUTOMATIC SIGNAL BOXES.—C. T. Chester, New York city.

I claim, 1st, The combination of a train of wheels controlled by escapement and driving an electric circuit wheel, with a sliding actuator, which is engaged with the winding lever of the train, or is disengaged from it at pleasure, substantially as described.

2d, The combination of this sliding actuator with the box cover, so that dust and other matters are excluded from the interior, substantially as described.

3d, The combination of a train of wheels, controlled by escapement and driving an electric circuit wheel, with a stopping lever which is moved by the actuator, and which engages with the stopping pin of the circuit wheel, substantially as described.

71,702.—LINE HOLDER.—S. J. Clark, Detroit, Mich.

I claim the eccentric wheel, A, stop, B, plate, D, and the cap, C, or substantially the same, for the purpose designed.

71,703.—TEMPORARY BINDERS FOR MUSIC, ETC.—John C. Clarke, Jersey City, N. J.

I claim, 1st, The combination of the rigid metallic back, C, having cross

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slots, c', formed in it, and the hinged side plates, D, with each other, substantially as herein shown and described and for the purpose set forth.

2d, The combination of the cord or cords, E, with the slotted back plate, C, substantially as herein shown and described and for the purpose set forth.

3d, The combination of the slotted back plate, C, and hinged side plates, D, with the side boards, A, and back, B, of the cover, substantially as herein and described and for the purpose set forth.

71,704.—TRACK CLEARER.—M. E. Cogan and M. R. Russell, Mobile, Ala.

We claim, 1st, The scrapers, G G', having the gain, e, and the transverse slots, i i, substantially as and for the purpose desired.

3d, The combination of the scrapers, G G', with the standards, C C, handles or levers, D D, and springs, F H H', when constructed and operating substantially in the manner and for the purpose specified.

71,705.—THILL COUPLING.—James P. Collins, Troy, N. Y.

I claim, 1st, The connecting of the thills of a vehicle to the axle thereof by means of any suitable flexible material, substantially as and for the purpose specified.

2d, The socket, A, provided with the two internal parts or compartments, a b, in connection with the key or wedge, F, and the looped end of the flexible material, Cx, provided with the metal plate, E, and secured to the under side of the thill, C, all arranged substantially as and for the purpose set forth.

71,706.—SAFETY POCKET.—Joseph Colton, New Orleans, La.

I claim the combination of the jaws, A B, piece, C, slides, a, spring sides, b d, springs, e f g, pin, h, and the pocket, as herein described, for the purpose specified.

71,707.—DENTAL SUBSTITUTE.—George W. Cool, Portland, Oregon.

I claim the mode of fastening the thin plate or lining to the vulcanite or other dental plate heretofore in use, in the manner above described.

71,708.—FIRE FRAME FOR CHIMNEYS.—John Correja, Brooklyn, N. Y.

I claim the metallic jambs for kitchen chimneys, formed in the manner and for the purposes set forth; and in combination therewith the metallic lintel, throat piece, and back plate, as and for the purposes set forth.

71,709.—FLOUR BOLT.—Martin Cosgro (assignor to himself and Geo. H. Reynolds), Peoria, Ill.

I claim a bolt, B, provided with broad arms, or wings, C, constructed and arranged substantially as described, for promoting and equalizing the currents of air, which are made to pass through the bolt by means of the exhaust fan, K.

71,710.—MANUFACTURE OF HORSESHOE NAILS.—Harley D. Cowles, Bridgeport, Conn., assignor to the Bridgeport Horseshoe Nail Company.

I claim, 1st, The compound cutting apparatus, consisting of the series of dies and the series of cutters, substantially as herein described,

2d, The The method, herein set forth, of making nails for horseshoes, namely, by first rolling the plate to the form described and represented by figs. 1 and 2, and then cutting the nails therefrom by means of the series of dies and series of cutters, secured or formed in sectional holders, all as herein described.

71,711.—DRAUGHT AND VENTILATING DEVICE FOR OPEN GRATES, ETC.—Jas. M. Crockett, Newbern, Va.

I claim the arrangement and construction of the box, A, damper, C, lid, E, and pipe, D, when combined as herein described and for the purposes set forth.

71,712.—MEDICAL COMPOUND.—William Davidson (assignor to himself and William J. Rannie), Binghamton, N. Y.

I claim the composition herein described for the purposes set forth.

71,713.—BELT-LACING DEVICE.—David P. Davis, New York city.

I claim the two-part lacing, A, for belts, etc., each similarly constructed, substantially as described.

71,714.—SHINGLE MACHINE.—Benj. Day, Bangor, assignor to himself and A. L. Smith, Orrington, Me.

I claim, 1st, The sliding frame, B, adjustable forming board, H, knife, K, and self-adjusting roller, I, all constructed and arranged to operate in the manner and for the purpose substantially as described and shown.

2d, The auxiliary bearing, o, constructed and arranged to move with the forming board a part of its descent, and to resume its position and office upon the ascent of the forming board, substantially in manner as and for the purposes specified.

3d, In combination with knife, K, and roller, I, the hinged shield, L, substantially as described and shown.

71,715.—PLOW.—Samuel T. Denise, Red Bank, N. J.

I claim the combination, in a plow, of the vertical roller, E, with the horizontal roller, I, the latter rotating the former, substantially in the manner and for the purpose specified.

71,716.—WASHING MACHINE.—George M. Denison, New London, Conn.

I claim, 1st, The rubbing surface composed of bristles arranged in rows, alternating with elastic ribs or ridges, substantially as and for the purpose specified.

2d, The roller, C, arranged in relation with the rows of bristles, and the elastic ribs or ridges, substantially as and for the purpose specified.

3d, The rubber, constructed in the manner specified, in combination with the guides, a, in the side pieces of the corrugated board, substantially as and for the purpose herein set forth.

71,717.—CAR COUPLING.—M. Disney, San Francisco, Cal.

I claim, 1st, A car coupling, having a movable retaining lip, C, clutch, b, and the detaching lever, E, the whole constructed and operating substantially as and for the purpose herein described.

2d, The automatic catch, d, constructed and operating substantially as and for the purpose described.

71,718.—HARVESTER RAKE.—J. A. Dodge and Geo. Perry, Auburn, N. Y., assignors to John A. Dodge.

We claim, 1st, The switch, S, constructed, arranged, and operating as described.

2d, The combination, with a continuously rotating rake, of a vertically moving latch, T, constructed, arranged, and operating as described.

3d, The combination, as described, of the vertically moving switch, S, with the stop, s1, for the purpose set forth.

4th, The combination, substantially as described, with the continuous cam guide of the switch arranged to play vertically to change the path of the rakes.

5th, The combination, with a continuous cam guide, K, of an outside track, k, a switch, S, and a latch, T, when both the latter are arranged to play vertically, for the purposes set forth.

6th, The combination of the switch, S, the crank arm, s2, the cord, s3, the spring, s4, all constructed and arranged as described, for joint operation.

7th, The comb nation of the independently hinged rising and falling rake arms, continuously rotating round a common center, with the continuous cam guide, the vertically moving switch, and the latch, whereby either one of the arms can be used as a reel or as a rake, at the pleasure of the operator.

8th, The rake arms, having curved depending arms carrying friction rollers, and operating as described.

9th, The arrangement of the friction rollers on the bent arms, n, so that they always travel outside of the continuous cam guide, K.

10th, The combination of the continuous cam and fixed cam plate, with the independently hinged, continuously rotating, rising and falling arms, carrying friction rollers, running outside of the cam guide, and controlled by the switch, whereby the beaters are made to act as either a rake or a reel, as required.

11th, The combination, substantially as described, with a continuous guide, a cam plate, a cam plate, a switch, and a latch, of independent continuously revolving rising and falling arms, a crown wheel carrying the arms, and a bevel wheel to rotate them.

12th, The combination and arrangement, substantially as described, of the drag bar, the adjustable shoe, and the finger beam, with the raking mechanism, whereby the rake can be mounted directly over the shoe, without interfering with the adjustability of the shoe.

13th, Mounting the rake on the adjustable bar, h, as and for the purpose described.

14th, The combination of a platform and hinged drag bar, having a standard mounted on each, with raking mechanism mounted in a frame adjustable backward and forward on the standards, substantially in the manner and for the purpose described.

71,719.—YARD MEASURE.—Joseph Douglass, McConnellstown, Pa.

I claim the yard stick, with handle, B, and measuring flanges, C C', substantially as described.

71,720.—CAR BRAKE.—Eugene Hippolyte Duru, Paris, France.

The adjusting gear, B F N, in combination with the pincers, C, and with a railroad car, substantially as and for the purpose set forth.

71,721.—LOCKING KNOB LATCH.—Carl Herrman Eiffler, New York city.

I claim, 1st, The arrangement of an adjusting screw, a, provided with a transverse hole to receive the set screw, b, in combination with the spindle, C, and knobs, D E, constructed and operating substantially as and for the purpose set forth.

2d, Inclosing in the knob, E, the mechanism which serves to throw said knob in and out of gear with the latch, substantially as and for the purpose set forth.

3d, The nut, c, on the spindle, C, in combination with the movable stump, d, tumblers, g, knob, E, and latch, B, constructed and operating substantially and for the purpose set forth.

4th, The safety stop, o, in combination with the knob, E, washer, F, and latch, B, constructed and operating substantially as and for the purpose described.

5th, The disk, f, provided with cam slots, e e, in combination with the movable stump, d, safety stop, o, and tumblers, g, constructed and operating substantially as and for the purpose set forth.

6th, The aontment, u, in combination with the keyhole and with the safety stop, o, constructed and operating substantially as and for the purpose described.

71,722.—NUT LOCK AND WASHER.—Edward A. Ellsworth, Washington, D. C.

I claim, 1st, The spring nut lock, R, and washer, A, constructed in one piece, substantially as described, for the purpose specified.

2d, One or more points or downward projections or flanges, a, in combination with the spring nut lock and washer, substantially as described, for the purpose specified.

71,723.—DOUGH-KNEADING MACHINE.—Samuel Emmore (assignor to himself and A. Burkholder), Stouchburg, Pa.

I claim, 1st, The shaft, C, when provided with a screw thread, so as to impart a combined intermittent rotary and reciprocating motion for the stirrers of a dough kneading machine, substantially as and for the purpose herein shown and described.

2d, The tub, A, when consisting of two parts hinged together, in combination with the sliding cover, D, all made and operating substantially as herein shown and described.

71,724.—FERTILIZING COMPOUND.—Levi S. Fales, Tarrytown, N. Y.

I claim the fertilizer, composed of sea sand, sulphate of ammonia, charcoal, bones, and dried blood, substantially as herein set forth.

71,725.—FERTILIZER.—Levi S. Fales, Tarrytown, N. Y.

I claim the fertilizer, formed by the combination of the several specified materials, substantially as herein set forth.

71,726.—SADDLERS' AND SHOEMAKES' TOOLS.—George V. Farr and Ephraim Hall, Brandon, Vt.

We claim, 1st, The channelling tool above described, composed of the adjustable knife, B, the stock, A, and the spring cap, C, the lip or bottom of the cap, and the shoulder, O, of the stock, forming a gage to bring the knife at the edge of the sole to be channelled, substantially as set forth.

2d, The rounded or curved forms of the cap, C, and shoulder, O, in the direction of their length, substantially as and for the purpose described.

71,727.—BIT BRACE.—Samuel F. Fenn (assignor to himself and F. B. Clark), Middletown, Conn.

I claim the spring stirrup, a, attached by the pivot, b, to the spindle, A, of a brace, constructed and operating substantially as and for the purpose described.

71,728.—DEVICE FOR FILLING AND PACKING ROTARY PAPER PULP BOILERS.—Albert Fickett, Rochester, N. Y.

I claim, 1st, The use of a screw shaft and a movable head working upon and operated by the screw shaft, substantially as above described.

2d, The said screw shaft and movable head, in combination with the use of the tight pulley, A, operated by two bolts, one open, the other crossed, in conjunction with the lever, H, and the belt tighteners, b b, substantially and for the use above described.

3d, The use of two or more guide pieces fastened to the interior surface of the rotary or cylinder in a longitudinal direction, which perform the double function of preventing the movable head from turning when the screw shaft is put in motion, and of agitating the contents of the rotary.

4th, The use of a hollow and perforated screw shaft, substantially and for the use above described.

5th, The use of a perforated piston head to allow free circulation of the liquor and steam, substantially as above described.

71,729.—LOW WATER INDICATOR.—R. A. Filkins, North Adams, Mass., assignor to himself and W. B. Werden, Waukegan, Ill.

I claim, 1st, The tube, E, in combination with the tube, B, whereby the cold air is prevented from striking the tube, B, while hot water is in the latter, substantially as described, for the purpose specified.

2d, The lever, F, pivoted to the arm, h, of the globe, C, sliding rod, l, to which the float, G, is secured by the chain, n, packing tube, m, and spring, o, all arranged and operating as herein set forth, for the purpose specified.

71,730.—ROTARY STEAM VALVE.—R. A. Filkins, North Adams, Mass., assignor to himself and W. B. Werden, Waukegan Ill.

I claim the construction of the hollow conical valve, C, and its arrangement with the shell, E, nut, F, flange, c' partition, j, ring, f, shoulder, m, and pipe, A, all made and operating substantially as and for the purpose herein shown and described.

71,731.—ROOFING CEMENT.—R. H. Fitts, Lawrence, Kansas.

I claim the composition, substantially as described, and for the purposes set forth.

71,732.—TOY GUN OR PISTOL.—F. Fuller, New York city.

I claim the combination of the discharging-rod, C, constructed with a grooved head, b, the spring chamber, a', substantially as set forth. The wedge-shaped trigger, E, arranged to elevate and release the discharging rod, C, and the shoulder, c', with the stop, g, and depressing spring, h, all constructed substantially as set forth and described.

71,733.—DRESS FOR MILLSTONE.—A. N. Garland, West Charton, Vt.

I claim the millstone dress above described, consisting of the smooth surface inside, and the file surface outside of the line, D, together with the smooth shallow channels in the bed stone, and deeper ones in the runner, the channels in both stones being constructed in the curved form above described, widening towards the rim of the stones, and having one smooth inclined surface and one perpendicular wall, c', the upper edge of the wall being sharp and smooth, and all the parts being constructed and arranged substantially in the manner and for the purposes specified.

71,734.—PLOW.—George Gibbs, Canton, Ohio.

I claim, 1st, The straight beam, a, in combination with the detachable wooden brace, b, fitted into sockets, for the purpose as herein specified.

2d, The land side, d, of the form and for the purposes as set forth.

3d, The colter nose, e, made and used as and for the purpose specified; and

4th, The beam, a, brace, b, land side, d, and colter nose, e, combined to form the design specified, when made and used as herein described.

71,735.—PLOW.—William Gibbs, George Gibbs, and Louis P. Wikidal, Canton, Ohio.

We claim the flange on cast shares, when constructed and used as herein before described.

71,736.—FENCE.—Samuel Good, Greensville, Ohio.

I claim the blocks, A and B, when constructed substantially as described, having a suitable base, C, and formed into a fence, as specified.

71,737.—RAILROAD GATE.—A. C. Goodman, and Henry Fessler, Canton, assignors to themselves and Henry Foltz, Stark County, O.

We claim, 1st, The gate, C, provided with a weight, D, which causes it to assume a vertical position when not confined, as and for the purpose set forth.

2d, The arrangement of the crank shafts, E, with their bars, F, connecting-rods, G G, and the gate, C, as and for the purpose specified.

3d, The arrangement of the spring notched bar, H, with the crank shaft, E, and gate, C, as and for the purpose set forth.

71,738.—REGULATOR FOR MARINE CLOCKS.—A. I. Goodrich, Waterbury, Conn.

I claim a regulator for marine clocks, made of one piece or strip of metal from end to end, substantially as described.

71,739.—BAG TIE.—John J. Gordon, Flint, Mich.

I claim the bar, A, hook, B, and cord, C, constructed, combined, and used, substantially as and for the purpose set forth.

71,740.—BALING PRESS.—Jackson Gorham, Bairdstown, Ga.

I claim the arms, I, constructed as described, having diverging side pieces, b b, the bottoms of said arms resting in grooves of the framing, d, and attached to the ends of the rope, J, which passes over the pulleys, e, in the end of the lever, H, to the shaft, C, all arranged and operating as herein described.

71,741.—SHAFT ATTACHMENT TO CARRIAGES.—Jackson Gorham (assignor to himself and John Armstrong), Bairdstown, Ga.

I claim the attachment to carriage shafts, consisting of rods having hooks, and hung to the whiffletree and sliding hooks, substantially as and for the purpose described.

71,742.—APPARATUS FOR MAKING PAPER ARTICLES.—Harrison Grambo, Philadelphia, Pa.

I claim, 1st, Forming articles from paper pulp, complete by continuous operations, substantially as described.

2d, The feed and agitator box, G, substantially as described, for the purpose specified.

3d, The interlacer, E, substantially as described, for the purpose specified.

4th, The cone, I, and flexible former, K, substantially as described, for the purpose specified.

5th, The cords, p, and windlass, n', or equivalents, in combination with the former, K I, substantially as described, for the purpose specified.

6th, The blocking mechanism, L M N, substantially as described, for the purpose specified.

7th, The drying and pressing cylinder, N', in combination with the blocking mechanism, L, and blast apparatus, O, substantially as described, for the purpose specified.

8th, The flocking device, U V, substantially as described, for the purpose specified.

9th, The series of set screws, S, arranged in circular form, carrying cam rollers, T, on swivel arms, u, for the purpose substantially as described.

10th, The combination and arrangement of the various devices and parts herein described, or their equivalents, operating in the manner and for the purpose substantially as described.

71,743.—MEDICATED BALSAM.—Lucia F. Griffin, New York city.

I claim a medicated balsam composition, of the ingredients herein named, as and for the purposes set forth.

71,744.—DISTILLING APPARATUS.—Theodore Grundman, Cleveland, Ohio.

I claim, 1st, The vessel, B, when connected with the upper part of the retort, by means of pipes, a and B, and when provided with a dish-shaped cooling cover, substantially as and for the purpose herein shown and described.

2d, The retort, A, and vessel, B, when made and arranged as set forth, in combination with a cooler, E, as described.

71,745.—SASH STOP.—James R. Hall, Georgetown, Ill.

I claim the combination of the spring, E, and lever catch, G, and eccentric roller, I, substantially as and for the purpose described.

71,746.—STREET PAVEMENT.—Alexander Hamar, New York city.

I claim, 1st, The method herein described of paving streets by the employment of small blocks of wood glued together to form sections of about four feet square, which sections are arranged side by side upon a bed composed of sand, lime, and silicate of soda, with spaces between the sections to be filled with asphalt, as herein before described.

2d, Also, the combination, as described, of the small wooden blocks glued together in sections, the mortar foundation, the parallel timbers underlapping the joints of the sections, and the asphalt filling between the sections, for the purposes set forth.

71,747.—GRADING AND EXCAVATING MACHINE.—T. C. Hammond, Nicolaus, Cal.

I claim, 1st, The construction of a plow with an angular upright standard, having a sole plate and wing, and a mold board and share, together with all the connecting parts, substantially as described, for the purpose specified.

2d, A double plow of the above description, all of the different parts of which are reversed and pointing and facing in opposite directions, and connected by a continuous beam and furrow bar.

3d, The peculiar circular bevelled shape of the apron frame plate, 2, by means of which the apron frame is closely fitted to the under side of the mold board of the plow.

4th, The construction of a double-acting traction horse-power, working upon two wheels with separate reversed parts, the whole being so constructed as to work in opposite directions without turning.

5th, The construction of the wooden extension bridge, before described, for the purpose before described.

6th, The different parts of said machine, when combined, as forming in whole a machine so constructed as to work in opposite directions upon the same side of a given line or embankment without turning.

71,748.—HANGING TEA-KETTLE LID.—C. C. Hare, and S. J. Hare, Louisville, Ky.

We claim, 1st, Making a tea-kettle with a swinging lid in two pieces, connected and operating as herein described.

2d, A swinging lid, having a curved or semi-circular slot, c, in the rim, b, in combination with the ear, e, the bail, d, and the pin, a, of a tea kettle, arranged and operating as herein described.

71,749.—FIELD DERRICK.—Isaac J. Hattabough, Santa Clara County, Cal.

I claim, 1st, The doublesheaves for the operating line.

2d, The pivots and plates at top and bottom of the pole, for the guys and pole swivel.

3d, The combination of the sheaves, H, with the pivots to plate, II, in combination with operating rope, E, pole, A, arm, B, adjuster, D, guys, J, to make a simple and complete combination for a derrick for field purposes, as described, and substantially as set forth.

71,750.—FENCE.—C. Augustus Haviland, Davenport, Iowa.

I claim 1st, The arrangement and combination of boards, blocks, and posts in the manner and for the purpose herein set forth.

2d, The construction of a fence post, with slot or aperture, C, in the manner and for the purpose herein described.

71,751.—PILL AND OTHER BOXES.—George H. Hawkins, New York city.

I claim forming pill or other boxes of buckram, or other woven fibrous material, stiffened with starch or other glutinous material, and struck up into proper shape while moist or damp, by means of hot metal dies, substantially as herein shown and described.

71,752.—COMPOSITION FOR COATING WOODEN STRUCTURES.—Joseph Heckel, Decatur, Ill.

I claim the composition above described, when compounded and used substantially as and for the purposes specified.

71,753.—STEREOSCOPE.—Alexander Heilbrun, Cincinnati, O.

I claim, 1st, The arrangement of the two shafts, G and H, endless chains, J, fingers, L, arms, Q R, roller, O, and catches, X, in the described combination with the series of slides secured to one or more endless ribbons, T, in the manner and for the purpose set forth.

2d, In the described combination, the fingers, L, groove, h, roller, O, arms, Q and R, and the catches, X, for the purpose set forth.

3d, In combination with the elements of claim, 1st, I claim the springs, g, for holding the slides to the under side of the open frame, F.

4th, The guard or partition, Z, curved upward at its front end, as and for the purpose stated.

5th, The hinged and folding foot, i, having the bracket, j, and screw, k for the purpose set forth.

71,754.—MANUFACTURE OF IRON.—David W. Hendrickson, New York city.

I claim the use of zinc or zinciferous ores, manganese, or the Franklinite ores, as a flux or a mixture in iron-furnaces, in combination with the compound blast of superheated steam and air for manufacturing iron suitable for the Bessemer process of and for manufacturing steel and other purposes, substantially in the manner and for the purpose herein set forth, and shown in the accompanying drawings.

71,755.—LIFE PRESERVER.—D. H. Heyen, New York city.

I claim the air tube, B, in combination with the belt, A, attached and arranged substantially as shown and described for the purpose set forth.

71,756.—NOZZLE FOR FIRE ENGINES, ETC.—J. J. Hofer, New Orleans, La.

I claim an air chamber, in combination with the nozzle, constructed and operating substantially as and for the purpose described.

71,757.—DRY GAS-REGULATOR.—J. B. Hoffman, Philadelphia Pa.

I claim 1st, A bellows like receiver, H, applied to a gas regulator, and connected to the valve of the latter substantially as described, so that as the pressure of the gas varies, the receiver will expand or contract, and the opening for the passage of the gas will be increased or diminished in size.

2d, The chamber, I, and its tight detachable cap, j, arranged on the top of the regulator in respect to the weights, x, as and for the purpose set forth.

71,758.—APPARATUS FOR IRONING CLOTHES.—C. R. Hoyt, New York city.

I claim 1st, The ironing table, B, whose free end rests upon the posts, L, and spring, K, ironing roller, D2, upon shaft, S, revolving in contact with the curved fire plate, E2, fan blower, W, and driving shaft, P, all arranged as described for the purpose specified.

2d, The ironing table, B, pivoted to the frame, A, at one end, and whose outer end rests upon the posts, L, and spring, K, as and for the purpose specified.

3d, The combination of the fan blower, W, with the yielding spring ironing table, B, ironing roller, D2, and fire-pot, B2, substantially as described for the purpose specified.

4th, The arrangement upon the frame, A, of the driving shaft, P, pinion wheel, Q2, shaft, S, wheels, R T U, fan blower, W, grooved roller, N, cord, O, furnace, B2, ironing roller, D2, curved fire plate, E2, yielding ironing table, B, as herein set forth for the purpose specified.

71,759.—TIRE FORGE HEATING APPARATUS.—Jos. R. Humphreys, Pennsville, N. J.

I claim the casing, B, and box, A, constructed for the reception of a tire, and for application to a smith's forge, substantially as described.

71,760.—WASHING MACHINE.—Eli Hunt, Shelburn, Ind.

I claim an improved clothes-washing machine, consisting of the open cylindrical clothes-receptacle, C, provided with the litters, f, and rods, d, fitted within the cylindaical suds-box, A, the hinged doors in the hinged top of the suds box, and cylinder, all constructed, arranged, and combined to operate as described and specified.

71,761.—STEAM ENGINE GOVERNOR.—R. K. Huntoon, (assignor to himself and Charles S. Lynch), Boston, Mass.

I claim the arrangement and combination of the lever, e', rod, f', and weight, h', with the shaft, B, its propeller or propellers, D, the vessel, A, the ratchet, r', sectional frame, s, the pawls, t u, the rocker frame, b', and its cams or lifters, c' d', such ratchet being applied to a shaft, d, and the whole being substantially as specified.

Also, the combination and arrangement of the oil receiver, c, its eduction hole, e, and air pipe, f, with the governor as described.

71,762.—WINDLASS FOR BOATS.—Edgar Huson, Ithaca, N.Y.

I claim 1st, Making a boat windlass by the use of the slotted plate, E, about the shaft, G supported on the vibratory standards, K and F, and having the clicks, C and D, which act in the described manner on the ratchet or cog-wheel, B, and head, A, thus producing by both the forward and backward motions of the lever, one and the same motion of the rope, cable, or chain, as described.

2d, The combined whole, made as figured and described, for the purpose of a convenient and useful windlass for boats and other similar craft as described.

71,763.—HARPOON.—Zeno Kelley, New Bedford, Mass.

I claim the harpoon herein described, with rubber spring, C', on the end of the shaft, spiral spring, D', on the shaft, and stop, F', on the blade, and slide, E', on the shaft, or their equivalents, constructed and operating substantially as herein set forth and described.

71,764.—HAY RAKER AND LOADER.—Henry Kewley, Perry, Ohio.

I claim 1st, The raking device herein described, consisting of the series of movable and independent rake teeth, S, rake head, P, provided with apertures, side pieces, O O, rail, Q, journals, R R, stop pins, T, arm, T2, and pendent rods, T3 T4, all arranged and operating as and for the purpose herein specified.

2d, The said raking device, constructed as herein described, in combination with the conveyers, J, provided with sets of lines, K, and bands, I, as and for the purpose set forth.

3d, The pivoted apron or broad chute, U1, constructed with a series of fingers, U3, and turned-up sides, U2, supports, U, and cords, W, arranged and operating as and for the purpose specified.

71,765.—APPARATUS FOR LEACHING BARK.—Chas. Korn, Wurtsborough, N. Y.

I claim 1st, The vessel, A, when divided by means of partitions, B B, into various compartments, which are connected by means of pipes, H, with a perforated trough, G, the latter being also subdivided by means of partitions, substantially as set forth, all made and operating so that a constant circulation of the tanning liquid may be established between all the compartments, as herein shown and described.

2d, Providing the partition of the trough, G, with gates, and the pipes and holes, arranged in the bottom of the trough, with plugs or valves, substantially as described, so that the contents of some of the compartments may be made to circulate, leaving those of the other compartments intact, as set forth.

71,766.—INKSTAND.—Rufus Lapham, New York city.

I claim an inkstand, made substantially as described.

71,767.—PORTABLE FENCE.—Sebastian Leonard, Jr., Fairfield county, Ohio.

I claim the combination of the posts, A B, the keys, C C', brace, D, and cross ground-sill, E, all constructed and arranged substantially as and for the purpose described.

71,768.—BLEACHING VEGETABLE OILS.—Theo. Leonhard, Paterson, N. J.

I claim the vessel, A, containing a revolving shaft, E, with wings, D, or their equivalents, substantially as described, for the purpose of bleaching and preparing vegetable oils as set forth.

71,769.—RAILROAD SWITCH.—H. C. Lewis, Miller Township, Pa.

I claim the chains, provided with bolts, which pass into cross ties for securing the rails, J K, and allow the same to be moved laterally, as and for the purposes set forth.

71,770.—EYE GLASSES AND SPECTACLES.—Henry Lomb, New York city.

I claim the elastic bands or straps, a, in combination with an eye glass or spectacle frame, when such bands or staps are fastened to the frame only at or near their ends, and between such points are left free of the frame, with an opening or space between, substantially as described for the purpose specified.

71,771.—HOISTING MACHINE FOR STACKING HAY.—William Louden, Fairfield, Iowa.

I claim 1st, In the construction of a hay-elevating device a derrick, composed of two flexible supporting frames, so arranged that they shall be extended sufficiently to allow a load of hay to pass through between them, or contracted so as to pass through an ordinary farm gate, substantially as described.

2d, Supporting an elevated bar, B, by means of two independent supporting frames, one of which is securely braced to it, so as to impart sufficient rigidity, while the other is loosely pivoted, so that as the base of the derrick is extended or contracted, the inclination of the bar, B, will be varied, for the purpose of preserving the proper inclination of the bar on slanting ground, and to facilitate the labor of putting up or taking down, substantially as shown and described.

3d, In the arrangement for conveying the hay over the stack or other place where it is to be deposited, I claim the combination of the travelling pulley C, provided with a frame which straddles the bar upon which it works, the latch, D, applied to the frame of the traveling pulley and working into a notch or catch on the under side of the bar, as herein shown and described.

4th, Placing the drum, G, in a frame, F, connected to the derrick by joints or hinges, h, so that in hauling or moving the derrick it may be turned over in the center substantially as and for the purpose set forth.

5th, The pulleys, n m', or the hoisting power frame, l, the pendent hook, s on the sweep, p, in combination with the pivoted arm, o, all arranged to operate in the manner substantially as and for the purpose set forth.

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6th, Arranging the hoisting or elevating power, H, on the runners, i i, of the supporting frames, and securing it in this position to render the derrick rigid, substantially as herein shown and described.

71,772.—SPRING FOR DOOR.—Josiah J. Makey, South Brooklyn, New York.

I claim the spring constructed as described, of the parts, A B, secured to the door frame, substantially as described and for the purpose specified.

71,773.—PRESSURE GAGE.—James W. Maloy, Boston, Mass.

I claim 1st, The combination with a flexible diaphragm of the button, e, and stem, e', the lever, i k, and spring, k', as specified.

2d, The combination of a single lever, i k, rack, l, sliding cross piece, m, attached to the standard, g, and pinion, n, as and for the purpose set forth.

3d, The standard, g, and the support, f, and cross-pieces, h, in connection with the operative parts of the gage so constructed and arranged as to enable them to be easily removed from the casing, b, by simply unscrewing the ring, s, substantially as set forth.

4th, The attachment of a gage to the top plate of a fire extinguisher, substantially as specified.

71,774.—WAGON WHEEL.—Jared Maris, Athens, Ohio.

I claim 1st' The groove in the hub into which the spokes are fitted.

2d, The manner of fitting the spokes together in a solid ring by tongue and groove.

71,775.—APPARATUS FOR HAND AND YOKE LIFTING.—Morris Mattson, New York city.

I claim 1st, In combination with mechanism or apparatus adapted for hand or yoke lifting, singly or together, the use and application of a platform scale, operating substantially as and for the purposes set forth.

2d, The application and arrangement, in machines or apparatus for hand and yoke lifting, of the cresent, b b, or its equivalent, with suitable handles, b' b', in combination with the standard, B, substantially as and for the purposes set forth.

3d, So connecting such crescent, b b, and its standard with any base or support, by a male and female screw, or their equivalent, that the cresent can be raised or lowered, for the purposes set forth.

4th, The construction and arrangement of the adjustable yoke, E, substantially as and for the purposes set forth.

5th, In combination with such a yoke, or its equivalent, the arrangement of the ring, F, and variable chains, G, substantially as and for the purposes set forth.

6th, In combination with a yoke, E, for lifting, the arrangement of the adjustable hand rests, I I, substantially as and for the purposes set forth.

7th, The combination with a platform scale, of mechanism or apparatus for hand and yoke lifting, singly or together, when constructed as described, and for the purposes set forth.

71,776.—FURNACE FOR ROASTING AND REDUCING ORES.—Jabez Maunton, (assignor to himself Wright Duryea, Wm. Ennis, J. H. Van Riper, A. P. Cummings, and J. Wendell Cole), New York city.

I claim 1st, The combination in connection with a reversible draft in or through them substantially as described, of reducing chambers, E E, and an intermediate fuel chamber, F, severally chargeable from above, and communicating with each other at or near the base essentially as and for the purposes herein set forth.

2d, The combination, with a reversible draft essentially as specified, of regenerators, D D, reducing chambers, E E, and fuel chamber, F, connecting with the reducing chambers by passages at or near their base, and chargeable as well as the reducing chambers from above, for operation as herein set forth.

3d, In combination with a reversible draft and fuel and reducing-chamber or chambers, the vertical regenerators, D D, having their inlet and outlet passaegs connecting with the draft, arranged below substantially as described,

4th, The connection of the reducing-chambers, E E, with each other by a covered passage, G, arranged to pass through an intermediate fuel chamber, essentially as herein set forth.

5th, The arrangement in connection with the reducing chambers, E E, of an air pipe or passages, J, arranged to connect said chambers at or near their top, substantially as and for the purpose specified.

71,777.—MINERAL WATER.—Chas. E. Michel, (assignor to Frederick Von Phul), St. Louis, Mo.

I claim the mode of producing carbonated chalybeate water hereinabove described it being an artificial chalybeate water, containing the carbonate of the protoxide of iron.

71,778.—MUSKETO-NETS IN WINDOW BLINDS.—G. W. Miles, Philadelphia, Pa.

I claim the compound window-blind slats, B B, in combination with the musketo netting, b b, constructed arranged, and operating substantially as and for the purpose herein described.

71,779.—RETAINING AND RELEASING HOOK.—Geo J. Neveil, Philadelphia, Pa.

I claim the construction and arrangement of the hanger, A, link, e, and hook, f, substantially as and for the purpose described.

71,780.—APPARATUS FOR EXTERMINATING VERMIN.—M. V. Nobles, Elmira, assignor to himself and John C. Nobles, Rushford, N. Y.

I claim 1st, The fan blower, A, the furnace, F, and the vessel, G, with the parts thereun to connected, arranged, combined, and operating substantially as described for the purpose specified.

2d, Forcing a current of heated gas, vapor or air, either with or without annihilating powders or other substances in combination therewith, from the vessel, G, or its equivalent, substantially as and for the purposes described.

71,781.—WATER ELEVATOR.—Alonzo Norris, Spencer, N. Y.

I claim the reservoir, A, movable bottom, D, and valve plug, E, all combined and arranged together, substantially as and for the purpose described.

71,782.—CANDLESTICK.—Harrison Ogborn, Richmond, Ind.

I claim 1st, The hinged part, a, provided with the match-box, C, fitting into the body, A, of a candlestick substantially as described.

2d, The holes, i, in combination with the partition, d, of the body, A, of a candlestick, substantially as and for the purposes described.

3d, The combination of the hinged part, a, box, C, partition, d, holes, i, and spare end, D, with the body, A, of a candlestick, substantially as and for the purposes described.

71,783.—METHOD OF SAVING AND UTILIZING THE ALKALINE LIQUORS USED IN TREATING STRAW, WOOD, ETC.—Stoughton Pettebone, Niagara Falls, N. Y.

I claim, 1st, The saving and utilizing of the alkali liquor, after it has been once used (employed by paper manufacturers in subduing or subjecting straw, wood, or other fibers), by transferring the same from one boiling rotary or vessel to another, and strengthening it by the addition of fresh alkali liquor, substantially as above stated, instead of recovering the soda ash from the waste liquor by a separate process well known to the trade, or wasting it absolutely, as is generally practised.

2d, The mode above indicated of transferring the said alkali liquor from one rotary to another, while hot, by forcing the same under, and by the pressure of steam used in boiling the material, substantially as above described.

3d, As another mode of accomplishing the same result, the use of the principle of a vacuum formed in the vessel or rotary to which the said waste alkali liquor is to be transferred, by means of an air pump, and thus transfering the liquor and steam by atmospheric pressure, substantially as above described.

4th, The saving of the waste alkali liquor by transferring the same into a receiving tank or vessel, to be used over again in boiling paper stock, substantially in the manner above indicated.

71,784.—WOOL CARDING MACHINE.—Stephen C. Philbrick, Rockville, Conn.

I claim the rolls, G F, in combination with the rolls herein described, attached to a first breaker card, all constructed, arranged and operating as set forth.

71,785.—LOG WAGON.—I. S. Pigott, Central Station, West Va.

I claim the log wagon, constructed as described, having the frame, B, upon the axle, A, and provided with the dogs grasping the timber, all operating as described, whereby the depression of the tongue, D, raises the timber and places it upon the axle, A, and within the frame, B, as herein described, for the purpose specified.

71,786.—ROTARY PUMP.—John Poppe, Green Point, N. Y.

I claim, 1st, The combination of the flanged plates, a1 and a2, of the case, A, interior gear wheels, B and E, and piston head, H, with each other, said parts being arranged substantially as herein shown and described, and for the purpose set forth.

2d, The combination of the valve, L, operated from the drive shaft, F, to allow the piston head, H, to pass, and dropping again into place in the rear of the said piston head, to close the passage, G, substantially as herein shown and described.

3d, The combination of the gear wheel, V, gear wheel, T, having a projection or cam, X, formed upon its side, and vertical sliding or lifting bar, P, having an inclined shoulder, p', formed upon its side for the cam to operate upon, with each other and with the drive shaft, F, and valve L, substantially as herein shown and described, and for the purpose set forth.

71,787.—COMPOSITION FOR PRESERVING ANIMAL INTESTINES. Thomas L. Reed (assignor to the Atlantic Tubing Company), Providence, R. I.

I claim the use of glycerin and the several commodities herein enumerated in compound, substantially as and for the purpose specified.

71,788.—HORSE HOLDER.—John P. Reynolds, Mirabile, Mo.

I claim, 1st, The construction of the holder for horses, consisting of the wide body band, M, having the front and rear straps, N D, the upper end of the body band, M, secured to the platform having the central post, J, passing loosely through the cross bar, C, and elevated by means of the pulleys, K, rope, L, and windlass, P, all arranged and operating as herein described, for the purposes specified.

2d, Also the swivelled rest blocks for the horse's hoofs, arranged in grooves or ways, substantially as described.

71,789.—LAMP CHIMNEY.—E. B. Requa, Jersey City, N. J.

I claim a lamp chimney of flat form, or wider in one direction than in the other, with the flat sides made concave, and the upper part of the chimney, above the lower bulb part, made with a gradual taper, substantially as herein set forth.

71,790.—BASIN FAUCET.—Francis Roach (assignor to himself and Joseph Zane), Boston, Mass.

I claim the combination and arrangement of the valve seat case or the head extension. R, and its cap, H, with the faucet body, F, the valve, A, its operative screw, G, and spring, c.

Also, the combination as well as the arrangement of the valve case, D, with the valve seat case, R, its cap, H, the faucet body, F, the valve, A, its operative screw, G, and spring, c, the whole being constructed substantially in the manner and so as to operate as specified.

71,791.—SCAFFOLD.—Clark Robinson, Rochester, Minn.

I claim, 1st, The uprights, A, when provided with notches, a a, in combination with the spring bolts, F, and lever, e, for the purpose of supporting the platform, and for lowering the same when required.

2d, The windlass E, in combination with the frame, A, platform, D, and spring bolts, F, all made and operating substantially as and for the purpose herein shown and described.

71,792.—HAY RAKER AND LOADER.—Andrew Royse and Mathias K. Morris, Le Roy, Pa.

We claim, 1st, In combination with the rake teeth hinged to the main frame by levers, E E', the slotted and shouldered standards, G G', for guiding the rake in its rising and falling motions, and sustaining it from going too low, substantially as described.

2d, In combination with a rake for gathering the hay, a conveyor for taking and carrying up the hay, when used with teeth that are thrown out of and drop into said conveyer, first to take and carry up and then to deliver the hay, substantially as described

3d, In combination with the carrying teeth that are projected from and drop within the conveyor, the metal bed, g, for guiding and holding the teeth, substantially as described.

71,793.—MACHINE FOR CUTTING PAPER.—Geo. H. Sanborn, Boston, Mass.

I claim. 1st, Operating the knife by connecting it with the crank, X, in the manner described.

2d, In a paper cutting machine, the combination with the gage of rod, r, index, t, and graduated scale, s, in the manner and for the purpose set forth.

3d, The arrangement of gearing herein described, for regulating the speed of the knife, giving a slow movement on its downward stroke, and a quick movement on its upward stroke, as set forth.

11,794.—CULTIVATOR.—Jared W. Sanford, Byron, Ill.

I claim, 1st, The adjustable standards, B, attached to the plow beams, A, and braced by bars, D D', in the manner substantially as and for the purpoae herein set forth.

2d, The attaching of the plows, or shares, E, to the standards, B, by having the former at the lower ends of cylindrical rods, c, fitted in staples, d, at the front sides of the standards, substantially as and for the purpose specified.

3d, The combination of the hoe, rake and roller, with a cultivator, when all are constructed, arranged and applied to admit of either the plows or the hoe, rake, or roller, being used by simply inverting the implement, as set forth.

71,795.—TAG.—Frederick G. Sargent and Norman H. Bruce, Graniteville, Mass.

We claim the application to the cross metal wire or band, C, or its equivalent, of a coating of suitable material for uniting such band with the card paper of a tag, substantially as described.

71,796.—GRAIN SEPARATOR.—Abram Schenck, Ovid, Mich.

I claim the combination of the frame, A, with the cross beams, B B, the shaft, C, the hubs, D D D, and the wings, I I I, of the fan, the pulley, E, the hoppers, F M1 M2 M3, the flues, N N N, the conductors, O O O, the depressed boxes, K K K, the bottom valves, L L L, the weights and cords, J J J, and the valves, G G G, or their equivalents, all arranged substantially as described for the purpose designed.

71,797.—WOODEN WAGON SPRING.—Anson Searls, San Francisco, Cal.

I claim an endless wood spring and perch in combination substantially as set forth and described.

71,798.—MACHINE FOR BUNDLING WOOD.—Daniel D. Sherwood, Boston, Mass.

I claim, in combination with the table, c, the hinged jaws, f, having bolts for confining them together, and springs for throwing them apart, arranged substantially as and for the purpose set forth.

Also, the arrangement of the two sets of jaws, with the shelf or shelves, and space between, substantially as and for the purpose set forth.

Also, in combination with the lower jaws and their expanding springs, the treadle, arranged to bring them together, substantially as described.

71,799.—SALIVA PUMP.—A. M. Shurtleff, Boston, Mass.

I claim combining with the suction or mouth piece of the saliva pump, an elastic valvular pump or bulb, connected at one end to the mouth piece by a rigid tube, and having attached to its opposite end a flexible pipe leading to the saliva vessel, substantially as shown and described.

Also, making the induction or suction end of the pump of hard rubber, or equivalent material, substantially as described.

Also, so connecting the discharge pipe with the saliva vessel, by means substantially such as described, that it cannot be withdrawn therefrom by the working or movements of the pump.

71,800.—HAND TRUCK.—Thomas A. Slack (assignor to himself and Chauncey Nye), Peoria, Ill.

I claim, 1st, The teeth or projections on the forward end of the body of the truck.

2d, The adjusting shovel, provided with the blade, h, the side piece, B, the slot, d, the projection, e, the foot guide, a, and the cross bars, c and i.

3d, The axle or pivot bar, b, when all shall be constructed, combined, arranged and operated as and for the purpose set forth and described.

71,801.—WAGON HUB.—Samuel W. Slocumb, Albany, Ill.

I claim, 1st, In combination with the hub, A, formed with an internal annular projection, A', two spindles, C C', and the axle, B, when the latter is attached to the spindle in front of their centers, substantially as and for the purpose set forth.

2d, The spindles, C and C', when attached to the axle as set forth and formed with a bearing, D, or friction roller, E, substantially as set forth.

3d, The spindles, C and C', when their sides are constructed with curves of different radius and they are arranged to operate substantially as and for the purpose set forth.

71,802.—WAGON BRAKE.—George P. Smith and John Desso, Lake City, Minn.

We claim the bar, G, pivoted to the under side of the front axle and provided with a slot for the bolt, J, and a series of holes through which the bars or rods, H and F, connect with it for operating the brake blocks through their bar, D, as and for the purpose set forth.

71,803.—LOW-WATER INDICATOR.—Levi F. Smith, Philadelphia, Pa.

I claim the arrangement of the part, D, recess, a, washer, C, cross bars, e, pipe, A, and whistle, B, substantially as herein set forth.

71,804.—BED BOTTOM.—Samuel A. Smith (assignor to himself and Edwin E. Woodman), Monroe, Wis.

I claim, 1st, The end springs, A A, in combination with rods, C C, substantially as described.

2d, The coil springs, d d, rods, C C, springs, A A, slats, D D, and webbing, f f, all combined substantially as specified.

71,805.—CARRIAGE.—Ephraim Soper, New York city.

I claim, 1st. The front perch, K, secured or swivelled to the top bed and back bar, or either, and pivoted with its rear end or ends to ears, g g, which project from the under side of the carriage body, substantially as herein shown and described.

2d, The combination of the front perch, K, when the same is made and operating substantially as herein shown and described with the ears, g, back bar, J, top bed, F, and C-springs, M, all made and operating substantially as set forth.

3d, The king bolt, I, when formed on and suspended from the under side of the upper transome plate, substantially as herein shown and described.

4th, The oil hole, c, in the upper transome plate, when arranged as described, to convey oil to the king bolt which is suspended from and formed on the upper transome plate, substantially as herein shown and described.

7,806.—BRIDLE BIT.—Jacob Spoonhour, Green Township, and Samuel R. Boyd, Chambersburg, Pa.

We claim the elliptical-shaped side piece, marked A, the clasp or bearing, marked B, the roller, marked C, and the screw or rivet, marked D, as represented on the accompanying drawing and hereinbefore explained and set forth.

71,807.—RAILROAD SWITCH.—W. H. Staats, Crescent, N. Y.

I claim the combination of the shifting bar, D, and hinged switch bars, C, arranged to operate in relation to the rails of the track and siding, substantially as set forth.

71,808.—SPRING BED BOTTOM.—Edward Steinel, Amsterdam, N. Y.

I claim, 1st, The bolts, c, and segmental cages, e, in combination with the springs, B, substantially as and for the purpose described.

2d, The C-springs, i, and hinged braces, k, in combination with the head piece, H, constructed and operating substantially as and for the purpose described.

71,809.—SPINDLE BOLSTER.—F. A. Sterry, Canton, Mass.

I claim, 1st, The absorbent or strainer in the bolster, B, consistsng of rings fitting snugly around the slotted central part of the boister and placed in the annular recess, a, and of less diameter than said recess, whereby the lubricant surrounds the circumference only of the absorbent and is strained through said absorbent to the spindle, as herein shown and described for the purpose specified.

2d, In combination with the absorbent or strainer as described placed in the recess, a, the screw cup, D, fitting air tight upon the top of the bolster, whereby a valve is produced which by screwing up or unscrewing regulates the quantity of oil to be strained through the absorbent to the spindle, as herein set forth for the purpose specified.

71,810.—COMPOSITION FOR POLISHING KNIVES.—Aaron W. Stewart, Middletown, Ohio.

I claim the polishing powder consisting of equal parts of the articles specified, when applied and used with the prepared cork, in the manner and for the purposes described.

71,811.—MILL PICK.—Uzziel Stewart, Berlin, Wis.

I claim the stock, A, in combination with the grooved plate, E, key, F, plate, C, and set screw, B, all constructed and arranged to secure the cutter in the stock, substantially as shown and described.

71,812.—FOLDING GLASS FOR PLANTS, HOT BEDS, ETC.—J. St. John, Stamford, Conn.

I claim, 1st, The two glasses hinged or pivoted together and furnished with the flexible end pieces, substantially as and for the purpose specified.

2d, The combination of the glasses, B, hinged frames or sashes, A, and flexible end pieces, substantially as and for the purpose specified.

71,813.—BRICK MACHINE.—Thomas Stone, Plainfield, Ind.

I claim, 1st, The rollers, I I, operated from the mud-mill shaft, C, by means of the gearing, G H H, in combination with the molds, F, operated from the rollers, I I, by the toothed rims, dx, and racks, e, all arranged substantially as and for the purpose described.

2d, The roller frames, L, carrying their molds when placed on springs, f when used in connection or combination with the rollers, I I, substantially as and for the purpose set forth.

71,814.—WOOD-PLANING MACHINE.—Anton Streit and Henry Streit (assignors to I. A. Fay & Co.), Cincinnati, Ohio.

We claim the removable glass facing, C, of the bed of a wood-planing machine, when constructed and applied substantially as and for the purposes described.

71,815.—CORN HARVESTER.—J. B. Sweetland, Pontiac, Mich.

I claim, 1st, The frame, A, with axle, B, ratchets, K K, and pulleys, M M, arranged for operating the spring knives, G G, and reels, F F, in the manner and for the purposes set forth.

2d, The knives, G G, in combination with the L-shaped knives, H H, reels, F F, guides, d, and springs, b b, or their equivalents, all constructed, arranged and operating substantially as and for the purposes herein set forth.

7,816.—HARVESTER RAKE.—J. B. Sweetland, Pontiac, Mich.

I claim, 1st, The rake, H, and arms, G and F, used with the wheel, D, and platform, B, and operating substantially as and for the purpose set forth.

2d, The guide, P, and pallet, Q, arranged in combination with the arms, F and G, and platform, B, all constructed and operating as specified.

3d, The arrangement of foot piece, Y, with the bars, O and N, rod, L, lever, M, and sleeve, K, for throwing the rake in gear at the time the grain is dropped, substantially as herein represented.

71,817.—CUTTER HEAD FOR DRESSING MOLDINGS.—Joseph Temple, Terre Haute, Ind.

I claim a molding cutter composed of a series of revolving disks each one of which has on its cutting edge the form of the section of the molding to be cut the several disks that form the series so arranged that, as a whole, they form a complete cutter to cut the molding, all constructed to operate substantially as described.

71,818.—STITCHING CLAMP.—Joseph Temple, Terre Haute, Ind.

I claim, 1st, The jaws, A and B, constructed substantially as represented, hinged together and operated upon by means of spring, G, as and for the purpose set forth.

2d, The tongue, C, used in combination with the jaws, A and B, and regulated substantially as and for the purpose set forth.

71,819.—HARNESS MOUNTING.—C. M. Theberath, Newark, N. J.

I claim the end of the hook, A, and lining, B, provided with a screw thread upon which the top, D, is screwed to retain said lining in position against the hook, as herein shown and described.

71,820.—DEVICE FOR TRANSMITTING MOTION.—Nathaniel Thompson, Farmington, Mich.

I claim, 1st, The arrangement of the parts, A B, parallel bars, b b, racks, c c, slide, C, pinion, D, with its shaft, E, plate, F, and rod, k, as herein described for the purpose specified.

2d, Giving the lateral oblique movement to the part, B, of the frame by means of the oblique slots, f h, and the bolt, e, and projection, g, working respectively therein, the bar, k, connected with the slide, C, and the projection, g, of the part, B, substantially as and for the purpose set forth.

3d, The spring, n, arranged or applied substantially as shown, to exert a pressure on the bar, k, and the bent rods, o o, arranged in relation with the spring, n, projection, g, and the ends of the oblique slot, h, to relieve the bar k, of the pressure when required.

71,821.—ADJUSTABLE SEAT FASTENER.—Walter T. Thornton (assignor to himself and Alexander D. Wright), Belleville, Mich.

I claim the construction of a wagon seat fastening substantially as described, with plate, A, projections, B B, etc., cap, C, rack, D, provided with seat rest, E, the catch, F, and the spring, G, or their equivalents, for the purpose set forth.

71,822.—BURGLAR ALARM DOOR LOCK.—Ezekiel Tracy, Kansas City, Mo,

I claim the combination of the lever bar, B, and supplementary bolt, Q, when arranged between the mechanism of a lock and a suitable alarm, for operating substantially as and for the purpose described.

71,823.—FORGE HAMMER.—Benj. Walker, Greenpoint, N. Y.

I claim, 1st, The combination with a power hammer having a spring or elastic and flexible device interposed between the driving gear and hammer proper to operate the latter, of mechanism consisting of the lever, K, slide, J, rod, I, and spring, m, or their equivalents, for changing the position of the fulcrum of said flexible device to vary, while at work, the stroke of the hammer without altering its velocity, all constructed and arranged substantially as specified.

2d, The arrangement and combination of the lever, K, slide, J, provided with crooked slot, s, rod, t, and bar, u, for action on the friction block, r, substantially as and for the purpose set forth.

3d, The cylinder or chamber, H, with its valve, k, in combination with the hammer stem, all constructed and arranged for operation together substantially as and for the purpose specified.

4th, The combination of the screws, v, and bolts, x, with the key or wedge, M, and tongue, w, for holding and adjusting the anvil, as herein set forth.

71,824.—SAFETY HOOK FOR WATCH CHAINS.—Antony Wallach (assignor to himself and Adolph Wallach), New York city.

I claim the tongue, i, attached to the shank, b, by the pin, o, so as to turn aside from the hook, c, in combination with the nut, d, as and for the purposes specified.

71,825.—BRAKE FOR SLEDS.—Samuel H. Wallize, Washingtonville, Pa.

I claim the construction and arrangement of the levers, H K and M, with their rollers, L and N, when combined with the drag bar, D, and operating the brake, G, as herein described and for the purposes set forth.

71,826.—PLUMBERS' AND PAINTERS' LAMP.—George Wanier (assignor to himself and Franz Wanier), New York city.

I claim, 1st, The lamp vessel, B, provided with a pipe, D, in combination with a lamp, A, and case, C, all arranged and operating substantially as and for the purpose specified.

2d, The lower stand, C, in which the lamp, A, is placed, in combination with the upper stand, C, and vessel, B, constructed and arranged substantially as and for the purpose specified.

3d, An automatic blow pipe, made to blow alcohol or other steam through the flame of a lamp, the steam being created by the same flame through which it is forced, substantially as herein shown and described.

71,827.—PLOW WHEEL.—J. B. Webster and Robert Baxter, Stockton, Cal.

We claim the board or plates, a, Fig. 1, in combination with the wheel, as and for the purpose hereinbefore described.

71,828.—DOOR HOLDER.—George Wells, Bethel, Conn.

I claim, 1st, The bolt or tail, C, and pad, D, operated in the manner and for the purpose set forth.

2d, The foot lever, A, in combination with the eccentric or cam, B, or an equivalent thereof, to operate the bolt or holder, C, for the purpose substantially as described and shown in the drawings.

71,829.—HORSE HAY FORK.—H. Williard, Grand Rapids, Mich.

I claim an improved horse hay fork, having a worm screw, A, on a spiral shank, a, in combination with a handle, B, arranged and operating substantially as herein described.

71,830.—CONCENTRATING CELESTIAL AND TERRESTIAL GLOBES.—Hugh Williamson, New York city.

I claim, 1st, The terrestrial globe, G, hung within, and having the same axis and center with the celestial globe, C, in manner substantially as above set forth and described.

2d, As a new article of manufacture, a transparent celestial globe, made of two hollow hemispheres, C C', having the constellations upon them, and the line, N, of the ecliptic, and the equinoctial and solstitial colures, L and M, when such hemispheres are adapted to receive terrestrial globe and universal horizon, and with the line of their junction forming the celestial equator, as herein shown and described.

3d, The universal horizon, H, suspended from the forked arms, I, of the axis, D, in manner and for the purposes substantially as set forth and described.

4th, The terrestrial globe, G, and universal horizon, H, in combination with the transparent celestial globe, C, in manner and for the purposes substantially as above set forth and described.

71,831.—CORN CAKE MOLD.—Benjamin Witherell, Charleston, Mass.

I claim the combination and arrangement of the two series of adjustable knives with each other, the flange, G, the platen and its series of followers, provided with springs, as specified, the whole being to operate with the bed, A, and the frame, B, thereof, substantially in manner and for the purpose as hereinbefore explained.

71,832.—HARVESTER.—W. A. Wood, Hoosick Falls, N. Y.

I claim, 1st, Connecting the finger-bar and cutting apparatus of a mowing machine to the main frame thereof by a yielding or spring connection, bolted rigidly at one end to the front outer corner of the main frame, and hinged at the other end directly to the shoe piece, which supports the finger bar and cutting apparatus.

2d, The use, in a mowing-machine, of a shoe piece or runner, which supports the finger beam and cutting apparatus, when said shoe piece is held in place at its rear end by a stirrup or loop passing over an axle, and is held laterally by a yielding spring connection, hinged at its lower end to the shoe, and bolted at its upper end to the front outer corner of the main frame.

71,833.—PORTABLE DERRICK.—Chatham B. Wright, Belmont, Ohio.

I claim the pawl, O, and adjustable tripping-block, R, in combination with the revolving derrick, D C H K, and hoisting rope, J, substantially as herein shown and described, and for the purpose set forth.

71,834.—CULTIVATOR.—Ira Barber, La Porte, Ind.

I claim the beams, B B, the chain, C, and the pivoted flat bar, D, the double curved shovel, F, and the slotted bar, I I, as substantially as arranged, connected, and set forth in the annexed and foregoing specification.

71,835.—HARNESS TRACE.—Thomas S. Judson, Matteawan, New York.

I claim, in combination with a wire interior, the application of cloth and india rubber coatings for forming a trace, when arranged in the manner and for the purposes set forth.

## REISSUES.

2,808.—HORSE HOE.—R. B. Dunn, and John C. Flint, Bangor, assignees by mesne assignments of Moses Chandler, East Corinth, Me.

We claim, 1st, The employment of two shares converging towards their rear, and made capable of adjustment to or from each other, either at their front or rear, or both.

2d, So attaching or jointing the forward ends of these shares to their supporting rods, as that they may be turned and adjusted thereon as centers, more or less obliquely relatively to the beam.

3d, The means, substantially as described, for adjusting vertically the rear ends of the shares to vary the depth of their penetration into the earth.

4th, The combination with the shares of pivoted wings, extending rearwards therefrom.

5th, So connecting the wings to the shares as that they will partake of their vertical adjustments, and also admit of being thrown up out of action when not needed.

6th, A wing constructed with a slightly concave curvature on its under side, to round up the earth as the furrow is covered.

7th, Supporting the shares upon bent rods capable of being adjusted laterally in the devices which hold them in position.

8th, Supporting the shares, both at front and rear, upon such rods to admit of either end being adjusted relatively to the other.

9th, So supporting the shares by means of rods and adjusting devices, that they may be lowered or raised, either at their front ends or at their rear ends at option or at both, substantially as shown and described.

10th, Securing adjustably and steadying the share supporting rods to the beam by means of screw-threaded eyes or loops and nuts.

11th, The adjustable and yielding cultivator blades, adapted to be lifted and thrown out of action when desired.

12th, The means, substantially as described, for adjusting the cultivator blades and their supports to or from each other, without unfastening them from the bars to which they are secured.

13th, Forming in one piece the cultivator blade support, and the coiled spring which sustains it, and admits of its various movements, substantially as described.

14th, The provision in the beam of a slot, J, as and for the purpose described.

15th, The adjustable stay rod, as and for the purpose described.

16th, The combination with the stay rods which brace the shares of the slot in the beam, and means for firmly securing the rods in variable positions, substantially as described.

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2,809.—HARVESTING MACHINE.—David J. Marvin, Stockton, Cal.

I claim,1st, In a combined header and thrasher, so pivoting or hinging the cutter frame upon the main axle, a, that it can be moved longitudinally, and also raised or lowered at pleasure, substantially as and for the purpose specified.

2d, In a combined header and thrasher, having its cutter frame mounted or hinged as above described, the combination and arrangement of the bar, a', posts, b' b', pulley, d', cord, c', and crank rod, N, substantially as and for the purpose herein set forth.

3d, The arrangemement of the sickle-plate, h, aprons, 2 and 3, corrugated feed roller, B, thrashing cylinder, P, fan, S, inclines, o p, straw-carrier, D, screen, E, conveyor, F, and elevator, G, substantially as described.

4th, In a combined heading and thrashing-machine, as above described, the arrangement of the lever, A, swinging axle, a, and gear wheels, b' Q, for the purpose of throwing the thrashing and cleaning mechanism into or out of gear, substantially in the manner specified.

## DESIGNS.

2,844.—COOK'S STOVE.—Conrad Harris and Paul W. Zoiner, Cincinnati, Ohio.

2,845.—DECORATING CROQUET-BALLS AND MALLETS.—Chas. Wright Kirby, New York city.

## PENDING APPLICATIONS FOR REISSUES.

*Application has been made to the Commissioner of Patents for the Reissue of the following Patents, with new claims as subjoined. Parties who desire to oppose the grant of any of these reissues should immediately address* MUNN & CO., *37 Park Row, N. Y.*

39,102.—LAMP BURNERS.—Wm. Painter, Baltimore, Md., and Charles Painter, Owing's Mills, Md., assignees of Wm. Painter, aforesaid. Dated June 30, 1863. Application for reissue received and filed Oct. 26, 1867.

We claim having the side pieces, h h, and the ends, g g, constructed and arranged in reverse inclined positions, in the manner herein shown and described.

The combination of the attachment above specified with the tubes, F A, the latter being screwed into the fountain or body, B, of the lamp and enclosing the wick adjusting wheels, b, as set forth.

Enclosing the wick ratchets, b b, within the tube, A, closed at its upper end to prevent the escape of vapor or odor as set forth.

Making the outer case, A, adjustable upon the tube, A, so that the hight of the cap, C, may be regulated as and for the purpose set forth.

46,219.—FIRE ENGINE.—The Gould Machine Company (assignees by mense assignments of John N. Dennisson), Newark, N. J. Dated Feb. 7, 1865. Application for reissue received and filed Nov. 22, 1867.

We claim, 1st, A force pump which may be adapted to throw a larger or smaller quantity of water at each stroke by varying the effective area of its piston surface in any manner substantially as herein set forth.

2d, A force pump provided with one or more parts or passages, the openings of which will relieve a part of the piston surface from labor or pressure on the water, so that the whole power of the steam piston can be applied to the water delivered from the pump by the operative parts of the piston.

3d, Increasing or diminishing the effective area of the pump or pumps, by means of a valve placed in the partition between them, or by other means substantially the same, so that the quantity of water discharged at a stroke can be increased or diminished at pleasure, without altering the speed or stroke.

69,181.—BUCKLE.—Ezra Cole, Fairfield, Mich. Dated Feb. 24, 1867. Application for reissue received and filed Nov. 23, 1867.

I claim the buckle constructed as described, consisting of the curved frame, A, having at one end the plate, C, provided with a downward projection or lug, D, in combination with the bail, E, whose pins, F, rest and slide upon the upper edges of the curved frame, A, as herein described, as and for the purpose specified.

49,799.—PLOWS.—William S. Spratt, West Manchester, Pa.—Dated Sept. 5, 1865. Application for reissue received and filed Nov. 23, 1867. Div. A.

I claim making a mold board for steel plows, with a bed for the plow share, said mold board and share bed being made in one or more parts, with the land side bolted to the share bed, the whole being constructad and arranged substantially as herein described and for the purpose set forth.

49,799.—PLOWS.—William S. Spratt, West Manchester, Pa.—Dated Sept. 5, 1865. Application for reissue received and filed Nov. 23, 1867. Div. B.

I claim making a mold board for steel plows with a bed for the plow share, said mold board and share bed being made in one or more parts, with the land side welded to the share bed, the whole being constructed and arranged substantially as herein described and for the purpose set forth.

52,297.—TOBACCO PIPE.—Gustav Lauteuschlager, Cincinnati, Ohio, and George L. Gott, New York city. Dated Jan. 30, 1866. Application for reissue received and filed Nov. 25, 1867.

We claim a bowl or a nicotin receptacle of a tobacco pipe, made of coal dust mixed with pitch or other suitable cement, and formed substantially as and for the purposes described.

1,493 (Whole No. 32,497).—CORK MACHINE.—Isaac Goodspeed, Norwich, Conn., A. A. Goodspeed, Putnam, Conn., and E. S. Stebbins, Worcester, Mass. Dated June 4, 1861. Application for reissue received and filed Nov. 20, 1867.

We claim the following to be the invention of the said Isaac Goodspeed, that is to say,—

We claim the combination composed of one or more cutters, a, tapering guides or frustra, b c (or the equivalent of the latter), the rotary shaft, d, and mechanism for advancing such cutter, or cutters, with respect to said shaft, while it and the cutter, or cutters, may be in revolution, the whole being to cut a conic frustum for a slab of cork, or other material.

We also claim the combination of the same and mechanism for holding the cork slab in place with respect to and while being cut by the cutters, such mechanism being the bunter, b, and its adjuncts, as hereinbefore specified.

We also claim a combination composed not only of one or more cutters, a, a shaft, d, tapering guides, b c, and mechanism for advancing such cutter or cutters, while in revolution with the shaft, but a mechanism for re acting the cutter, or cutters, after a cork or stopper may have been formed by them as specified.

We also claim the combination of the driving pulley, j, the shaft, d, one or more cutters, a, tapering guides, b c, and mechanism for advancing such cutter or cutters, while the same and the shaft, d, may be in revolution.

49,185.—CRANK PIN BOXES.—Thomas Welch.—Churchville, N. Y. Dated Aug. 1, 1865. Application for reissue received and filed, Nov. 27, 1867.

1st, I claim in combination with adjustable boxes in harvesters, a pitman so united therewith that it will move freely, or work independently of the boxes without cramping or binding the parts, for the purpose set forth.

2d, In combination with the adjustable boxes and independently acting pitman, a set screws, s, for the purposes set forth.

49,183.—HARVESTER.—Thomas Welch, Churchville, N. Y. Dated Aug. 1, 1865. Application for reissue received and filed Nov. 27, 1867.

I claim, 1st, Providing the crank pin box of a harvester with an oil reservoir, for the purpose set forth.

2d, The crank pin box or head of harvester, so constructed with reference to the crank pin as to project by or around the end of the crank pin, for the purpose specified.

3d, In combination with a crank pin box provided with an oil reservoir, a screw cap, G, or its equivalentt for the purpose of allowing the reservoir to be filled with and prevent the escape of unnecessary oil therefrom.

4th, A spherical taper pin, or conical shaped joint, for connecting the pitman and knife head of a harvester, when the parts of said joints are held together by means of a bolt passing into or through the knife head, for the purpose set forth.

5th, In combination with a spherical taper pin, or conical shaped joint, secured by a bolt as above specified, a washer made of leather, iron, India rubber, or any other suitable material, and used upon the said bolt for the purpose set forth.

☞ NOTE.—*The above claims for Reissue are now pending before the Patent Office and will not be officially passed upon until the expiration of 30 days from the date of filing the application. All persons who desire to oppose the grant of any of these claims should make immediate application to MUNN & CO., Solicitors of Patents, 37 Park Row, N. Y.*


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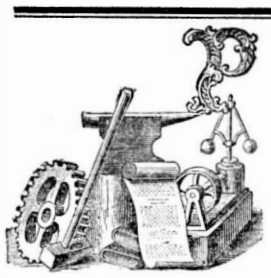

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**The First Inquiry** that presents itself to one who has made any improvement or discovery is: "Can I obtain a Patent?" A *positive* answer can only be had by presenting a complete application for a Patent to the Commissioner of Patents. An application consists of a Model, Drawings, Petition, Oath, and full Specification. Various official rules and formalities must also be observed. The efforts of the inventor to do all this business himself are generally without success. After a season of great perplexity and delay, he is usually glad to seek the aid of persons experienced in patent business, and have all the work done over again. The best plan is to solicit proper advice at the beginning.

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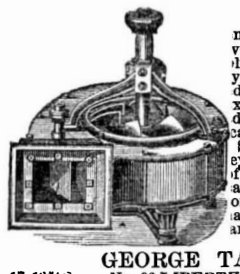

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